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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF:

DE FLORA, ET AL .

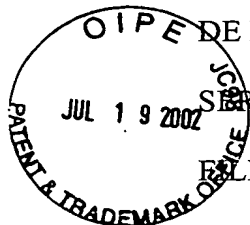
: EXAMINER: HOWARD V. OWENS, JR.

SERIAL NO: 09/125,022

FILED: November 24, 1998

: GROUP ART UNIT: 1623

FOR: PHARMACEUTICAL COMPOSITION ENABLING TO INHIBIT CANCER
METASTASIS FORMATION CONTAINING N-ACETYL-CYSTEINE AND
DOXORUBICIN



#37
7-25-02
S. Stone
1003

APPEAL BRIEF

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

This is an appeal from the Examiner's Final Rejection dated December 19, 2001, of
Claims 13-15, all of the then pending claims. A Notice of Appeal was filed on April 19,
2002.

I. REAL PARTY OF INTEREST

The real party of interest in this appeal is Zambon Group, S.P.A., having a place of
business at Via Lillo Del Duca 10, 20091 Bresso, Milan, Italy.

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II. RELATED APPEALS AND INTERFERENCES

Appellant, Appellant's legal representative and the Assignees are aware of no other
appeals or interferences which will directly affect or be directly affected by or have a bearing
on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 13-15 stand rejected and all are appealed.

IV. STATUS OF AMENDMENTS

In the Advisory Action dated April 9, 2002, the Examiner indicated that the Amendment filed on March 19, 2002 would be entered for purposes of appeal. However, the Advisory Action has a minor error which indicates that upon entry of the Amendment for Appeal, the claims on appeal will be claims 13 through 15. The Amendment added two new claims. Hence, the claims before the Board are Claims 13 through 17.

V. SUMMARY OF THE INVENTION

Appellants' invention is directed to a method for inhibiting the formation of metastases in a specific class of patient defined as one having a primary cancerous tumor, which has not yet metastasized but is capable of metastasizing (p. 6, lines 6-7). The method comprises administering to said patient a combination of two drugs, doxorubicin (also known as adriamycin) and N-acetyl-cysteine. The drugs are administered together in a synergistic mixture or individually in amounts within such a period as to act synergistically together to produce a cancer metastasis formation inhibiting effect (p. 1, lines 24-25, p. 2, lines 17-18). Claims 13, 14 and 15 are directed to the method (Claim 13) and the particular dosages of N-acetyl-cysteine (Claim 14) and doxorubicin (Claim 15).

Claim 16 is dependent upon Claim 13 and specifies that the doxorubicin is administered intravenously (p. 2, lines 17-19). Applicants' specification, in particular the paragraph bridging pages 11-12, shows that there is a significant difference in the ability to

reduce metastases when the doxorubicin is administered intravenously as opposed to intraperitoneally.

Claim 17 is dependent upon Claim 13 and defines the metastases being inhibited as “lung metastases.” The data in Table 2, Experiment 6, of Appellants’ specification (page 14) indicates that the combination is particularly effective at inhibiting lung metastases.

The references relied on by the examiner do not suggest that the combination of doxorubicin and N-acetyl-cysteine can be used in any way to inhibit metastases. Indeed, the references did not even mention the word “metastases.” When read in their entirety, the references do not suggest that the N-acetyl-cysteine would significantly enhance the efficacy of doxorubicin against tumors. Indeed, the prior art as a whole teaches that N-acetyl-cysteine does not appear to interfere with doxorubicin’s chemotherapeutic effect and that the survival pattern of tumorous animals containing or treated with doxorubicin and either saline or N-acetyl-cysteine “were not significantly different by the log ranked tests.” In other words, as will be discussed in more detail below, the Examiner’s conclusion regarding the obviousness of Appellant’s invention comes solely from reading Appellant’s disclosure.

VI. ISSUES

The sole issue in this appeal is:

Whether Claims 13-17 would have been obvious to one of ordinary skill in the art at the time the invention was made under 35 U.S.C § 103(a) in view of *Freeman et al.*, *Toxicology and Applied Pharmacology*, Vol. 54, pp. 168-175 (*Freeman*), in combination with *Doroshov et al.*, *J. Clinical Investigation*, Vol. 68, pp. 1053-1064 (*Doroshov*).

VII. GROUPING OF CLAIMS

The claims do not stand or fall together. For the purposes of this Appeal, the claims are grouped as follows:

Group I: Claims 13-15;

Group II: Claim 16; and

Group III: Claim 17.

VIII. ARGUMENT

Appellants' invention is directed to a new use of an old combination of pharmaceutical chemicals, doxorubicin and N-acetylcysteine, and a new use of an old process of administering the chemicals. Prior to Appellants' work, doxorubicin had been used to treat hematopoietic (blood) malignancies as well as "advanced" solid tumors of the breast, ovary, thyroid, and bone. (*Doroshov et al.*, p. 1053, col. 2). Unfortunately, doxorubicin has the horrendous side effect of inducing potentially lethal congestive heart failure because doxorubicin generates free radicals that lodge in the heart and are not readily removed therefrom. Accordingly, the prior art suggested the co-administration of free radical scavengers (antioxidants) of the sulfhydryl type, e.g., cysteamine or N-acetylcysteine, to assist the heart in removing free radicals.*

As will be discussed below, the use of N-acetylcysteine to scavenge free radicals generated by doxorubicin is the only clear use suggested by the prior art relied on by the Examiner. Appellants' invention is directed to the discovery of a "new" use for the old

* Interestingly the heart muscle appears to be relatively incapable of scavenging large amounts of free radicals by itself.

chemicals and process specifically that of administering the compounds to a class of patients having tumors susceptible to metastasis and preventing the formation of metastasis.

The Patent Statutes, 35 USC §§ 100, 101, Permit and Encourage the Granting of Patents For New Uses of Old Processes and Compositions of Matter

Since 1952, the patent statutes have specifically permitted the patenting of a new use for an “old process . . . composition of matter or material. (See 35 U.S.C. § 100(b)). An old process or composition of matter is already in the public domain. Yet, Congress deliberately chose to include as patentable subject matter the new use of an old process or composition of matter. One reason for this is the desire of the U.S. Congress to promote the progress of the useful arts by fostering investigation of old processes and materials to find new uses therefor.

There is no evidence of record that prior to Appellants’ work, those skilled in the art used the anti-cancer drug, doxorubicin, or combinations of doxorubicin and N-acetylcysteine to prevent metastasis in patients or even test animals. In assessing patentability, one must consider how many lives can be saved by knowing that a combination of doxorubicin and N-acetylcysteine may be used not only in a process for treating hematopoietic malignancies or advanced solid tumors as taught by *Doroshov et al.*, but also to treat tumors which are in their early stage and are subject to metastasization, in order to prevent the formation of metastases.

The Board should recognize that before a corporation can contemplate suggesting the use, commercially, of a combination of doxorubicin and N-acetylcysteine for the purpose of inhibiting tumor metastases, it is quite likely that the corporation selling the combination for that purpose would seek Food and Drug approval for the new use. Obtaining Food and Drug approval is an extremely expensive process. Accordingly, absent the grant of a patent, or some form of exclusivity, a corporation would be naturally reluctant to expend the funds

necessary to develop the new use invention and obtain FDA approval since there will be no way of recouping the investment.

Congress saw fit to enact legislation which permits obtaining patents for new uses of old processes and compositions because the grant of the patent serves to stimulate research and development and to bring valuable, potentially life saving, products to market.

Applicants' claims direct the invention specifically to the new use of inhibiting the formation of metastases in a patient having a primary cancerous tumor capable of metastasizing. Indeed, new Claim 17 is concerned with the new use of inhibiting lung metastases.

The Examiner's Rejection

Claims 13-15 and new claims 16 and 17 stand rejected as unpatentable under 35 U.S.C. § 103 over *Freeman et al.* in view of *Doroshov et al.* The Examiner advises that the reasons are of record on pages 2-4 of the Office Action mailed February 25, 1999. That Office Action does not contain a rejection under 35 U.S.C. § 103. Rather, the rejection in the Office Action of 2-25-99 was an anticipation rejection (35 U.S.C. § 102) which has been withdrawn in favor of the rejection under 35 U.S.C. § 103. Because reasons for the § 103 rejection are set forth in the Final Rejection and the Advisory Action, Appellants' arguments in this Brief are directed thereto.

Doroshov and Freeman Do Not Teach or Make Obvious the Claimed New Use

Both the *Doroshov et al.* and *Freeman et al.* references of record have studied the effects of doxorubicin in models which are not really suitable as models for metastasis formation. Importantly, neither *Doroshov et al.* nor *Freeman et al.* noted or even mentioned prevention of metastases, the use that is claimed herein.

The *Freeman et al.* reference is directed to a study of the ability of two sulfhydryl compounds, cysteamine or N-acetylcysteine, to antagonize the cardiotoxic lethality of adriamycin (doxorubicin). It is described therein that adriamycin exhibits cardiotoxicity when administered. In the paragraph bridging pages 173-174 of *Freeman et al.*, the cardiotoxicity problems associated with adriamycin are spelled out in detail as follows:

Many animals have been used to investigate the cardiomyopathy which can result from adriamycin [doxorubicin] chemotherapy. Single doses of adriamycin administered intravenously...or intraperitoneally...to mice produced a cardiomyopathy that was ultrastructurally similar to the changes seen in human cardiac tissue following adriamycin therapy.

Accordingly, the work done by *Freeman et al* with the combination of adriamycin and cysteamine or N-acetylcysteine was done to determine whether or not (a) either of these compounds prolonged the life of the patient by preventing heart problems, and (b) whether the compounds “alter or interfere with the antitumor effect of adriamycin [doxorubicin].” (P. 169. col. 1). To this effect page 175 of the article states:

We therefore propose that concurrent administration of the sulfhydryl compounds cysteamine or N-acetylcysteine may decrease the toxicity of adriamycin without decreasing its antitumor effect.

The author’s statement says nothing about metastases prevention and does not suggest that the N-acetylcysteine enhances the anti-tumor effect of doxorubicin.

The Examiner has noted a particular passage at page 174, column 2 of *Freeman et al.*, which states that at the lower dosage level of doxorubicin administration, the increase in “life span” was such that it suggested that the combination of adriamycin and sulfhydryl compound potentiated the antineoplastic effect of adriamycin. The Examiner relies on this statement, which says nothing about metastasis inhibition, as a general suggestion to use adriamycin with doxorubicin to prevent metastases. However, enhanced “life span” does not necessarily relate to tumor growth. Enhanced life span can be due to less heart damage.

The Board's attention is directed to Table 1 on page 172 of the *Freeman et al* article. This table sets forth the "life span" data which supports the previous statement. It is evident therein, that this potentiation effect is quite limited to the low dose of 1.5 mg/kg/day and that no potentiation was achieved when the dose of doxorubicin was 2.5 mg/kg/day. In other words, potentiation was not always achieved, and hence is not inherent. Indeed, the data show that (a) the life span was less when N-acetylcysteine was added to the treatment regimen at the higher dose (120 days versus 142 days for doxorubicin alone), and (b) at the lower dose cysteamine was superior to N-acetylcysteine. Accordingly, the Examiner's use of the life span data to suggest metastasis prevention is not warranted. All that the data really shows is that there is a significant difference in life span between the 1.5 mg/kg/day and 2.5 mg/kg/day adriamycin dosages (93 days versus 142 days). Indeed, it should be noted that Freeman et al attributed the increased life span which resulted at the lower dosage, to heart damage protection, not to prevention of metastasis. *Freeman et al* specifically note that the "mechanism for the reduction in adriamycin induced toxicity is probably an enhancement of intracellular sulfahydryl levels and subsequent detoxification of adriamycin metabolites which are cardiotoxic". (Page 174, col. 2)

Freeman et al., one of ordinary skill in the art, did not conclude that cysteamine or N-acetyl-cysteine should be used to enhance or potentiate the effect of doxorubicin. *Freeman et al.* concluded the following from his experiments:

We therefore propose that concurrent administration of the sulfhydryl compounds cysteamine or N-acetylcysteine may decrease the toxicity of adriamycin without decreasing its antitumor effect.

Freeman et al. did not say that the sulfhydryl compounds would enhance the effect of doxorubicin because his data was not consistent. Indeed, *Freeman et al.* specifically stated that "concurrent administration of cysteamine or N-acetylcysteine did not significantly alter [doxorubicin's] effect or tumor growth." (Page 173, col. 1, emphasis added.)

What is important, however, is that at no time did *Freeman et al.* suggest that the administration of a combination of doxorubicin and N-acetylcysteine could be used to prevent metastases of tumors, the new use set forth in the claims herein. *Freeman et al.* simply does not suggest this new use.

There is no evidence of record which shows that the *Freeman et al.* administration of the combination of doxorubicin and sulfhydryl compounds prevented metastases of tumors. Moreover, it is clear that even if the administration of the combination prevented metastases of tumors, *Freeman et al.* were unaware of it. It is well settled that that which may be inherent may not be known and if it is not known it cannot make something obvious. *In re Spormann*, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966). Moreover, the Supreme Court of the United States has advised that an accidental or unwitting duplication of an invention cannot constitute an anticipation. See *Tilghman v. Proctor*, 102 U.S. 707 (1880); *Eibel Process, Co. v Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923). See also *In re Felton*, 179 USP 295, 298 (CCPA 1973) in which the court relied on the *Tilghman* and *Eibel* process cases. Accordingly, the *Freeman et al.* work, which is directed to a type of tumor that is not a good model for metastases, cannot make the claimed subject matter obvious as set forth by the Examiner.

The Doroshow Teachings do not Make the Claimed Subject Matter Obvious. Whether Standing Alone or Combined with Freeman

As stated previously, *Doroshow et al.* teaches that “doxorubicin is an antineoplastic antibiotic that is now part of standard chemotherapeutic regimens for most hematopoietic malignancies as well as for advanced solid tumors of the breast, ovary, thyroid and bone.” (Emphasis added).

The work done by *Doroshow et al.* is simply not a good model for metastases. *Doroshow et al.*, like *Freeman et al.*, was concerned with doxorubicin cardiac toxicity and

the use of N-acetylcysteine (NAC) to prevent the cardiac toxicity. Despite the fact that *Doroshow et al.* did considerable work and considerable sampling of tissue, *Doroshow et al.* does not suggest that the combination of N-acetylcysteine and doxorubicin has any effect on metastases. *Doroshow et al.* attributes the enhanced survival of doxorubicin-treated mice that had received NAC to the ameliorating effect of NAC on the cardiac toxicity of doxorubicin.

When read carefully the *Doroshow et al.* reference specifically states that N-acetyl-cysteine is no better than saline in its ability to improve the survival pattern of animals treated with doxorubicin. On this point, it should be noted that at page 1059 *Doroshow et al.* includes a discussion regarding the “effect of NAC on the chemotherapeutic activity of doxorubicin.” It is stated therein:

After investigating the protective effect of NAC [N-acetyl-cysteine] on doxorubicin cardiac toxicity, we examined the relationship between NAC administration and the chemotherapeutic activity of doxorubicin. . . . We studied animals implanted with P388 leukemia, an experimental murine tumor. . . **by a routine test of significance (the log rank test), the survival of animals pre-treated with NAC was not different from that of mice receiving the same dose of doxorubicin but pretreated with saline. . . . Similar results were obtained using a lower dose of doxorubicin. . . . The survival patterns of the saline and NAC-pretreated groups receiving doxorubicin were not significantly different by the log rank tests. . . .** (p. 1059, emphasis added).

These results suggest that a dose of NAC. . . that oblates electron microscopic evidence of doxorubicin cardiac toxicity does not interfere with the drug’s anti-tumor activity against P388 leukemia.

Clearly, *Doroshow et al.* discovered there was no significant effect on the anti-tumor effect of doxorubicin upon the addition of N-acetylcysteine.

It appears the Examiner has misread the *Doroshow et al.* reference and reached an erroneous conclusion of obviousness because the Examiner’s Advisory Action of April 9, 2002 (page 2), states “the **prior art teachings** that N-acetylcysteine **significantly enhances** the chemotherapeutic effect of doxorubicin would provide one of skill in the art to use this combination in primary tumors as well as advanced tumors.” This statement is error because as noted above, *Doroshow et al.* states that “by a routine test of significance, the survival of

animals pre-treated with N-acetylcysteine was not different from that of mice receiving the same dose of doxorubicin but pretreated with saline.” (*Doroshov et al.*, p. 1059, emphasis added).

Doroshov et al. was aware of the *Freeman et al.* work and results and attempted to explain his (*Doroshov*’s) failure to observe an enhanced activity of doxorubicin in the presence of N-acetylcysteine. *Doroshov et al.* specifically stated (page 1062):

NAC [N-acetylcysteine] did not appear to interfere with the drug’s chemotherapeutic effect in P388 leukemia. . . . On the other hand in these experiments a substantial increase in the therapeutic efficacy of doxorubicin against P388 leukemia after NAC pretreatment could have been difficult to observe because NAC does not markedly diminish either the intestinal or hepatic toxicity of doxorubicin.

In other words, *Doroshov et al.* is attempting to explain away the fact that he did not observe a statistically significant enhancement of doxorubicin’s therapeutic efficacy by co-treatment with NAC.

Doroshov et al. also discusses the *Freeman et al.* work in the paragraph bridging pages 1062-1063. *Doroshov et al.* states:

Freeman et al. (41) have recently found that NAC does not decrease the therapeutic activity of doxorubicin against the Erlich ascites carcinoma; when doxorubicin was administered using a multiple, low-dose treatment schedule in their study, NAC significantly enhanced the chemotherapeutic effect of doxorubicin. These results suggest that a major cytotoxic effect of doxorubicin on tumor cells may not be related to free radical formation; in that circumstance, NAC could have its predominant impact on the cardiac damage produced by doxorubicin rather than its antineoplastic activity. (Emphasis added).

It is clear that *Doroshov et al.* did not interpret *Freeman*’s results as indicating enhanced neoplastic activity and prevention of metastases. Rather, *Doroshov et al.* interpreted *Freeman*’s results as indicating that NAC prolongs life span by preventing the cardiac damage produced by doxorubicin but does not decrease its therapeutic efficacy.

It is respectfully submitted that the references relied upon by the Examiner, when considered in their entirety, do not suggest combining doxorubicin with N-acetyl-cysteine to

enhance the therapeutic effect of the former. Indeed, the references suggest the combination may be no better than doxorubicin alone. More importantly, however, the references do not teach what is claimed by Appellants, namely the new use of deliberately administering a combination of doxorubicin and N-acetylcysteine to inhibit metastases formation in patients having a tumor that has not yet metastasized.

The Court of Appeals of the Federal Circuit, like its predecessor the CCPA, recently reiterated the importance of permitting patents for a new use of an old process or composition of matter. In *Rapoport v. Dement*, 59 USPQ2d 1215 (Fed. Cir. 2001), the Court was faced with a claim directed to a “method for treatment of sleep apneas” using an azapirone compound. The Court held that this new use was patentable over a reference which taught use of the same azapirone compound for the treatment of “anxiety” which was a symptom of sleep apnea.

Indeed, the reference even mentioned the possibility of administering the azapirone compound to patients suffering from sleep apnea but the Court noted that this was for the purpose of treating anxiety in such patients not for the purpose of treating the sleep apnea disorder itself.

The facts before the Board in this case are similar to the facts in *Rapoport*. The prior art cited by the Examiner in this case suggests administering N-acetyl-cysteine to a patient treated with doxorubicin in order to prevent damage with a patient’s heart. It does not suggest administering N-acetyl-cysteine to a patient who has a tumor that has not yet metastasized but is capable of metastasization in order to prevent the metastasization. This is a completely different class of patient. For example, as noted by *Doroshov et al.*, doxorubicin is normally given for “advanced solid tumors of the breast, ovary, thyroid and bone” (page 1053). These advanced tumors may have already metastasized. Appellants have described and claimed a new use for the doxorubicin/N-acetyl-cysteine combination, i.e.,

administering to patients who have tumors which have not metastasized in order to prevent the metastasis of the tumor.

In *Rapaport*, the Federal Circuit recognized the value of these new uses for old processes and compositions, the same value envisaged by Congress in permitting such patents. It may be that the Court recognized that possession of the patent right would provide the necessary incentive to do the work requisite for obtaining Food and Drug approval.

It should be noted that the *Rapaport* case is no "fluke" decided by an errant panel of the Federal Circuit. In *Rapaport*, the court reminded the PTO that the patent statute permitted such patents. The Federal Circuit's predecessor, the C.C.P.A., had similarly reminded the PTO in the case of *In re Marshall*, 198 USPQ 344, 346 (CCPA 1978), where administration of a drug for weight loss was considered patentable over administration of the same drug to lower the acid content of the stomach. See also *In re Shetty*, 566 F.2d 81, 86, 195 USPQ 753, 756-757 (CCPA 1977) (Adamantine drug used for new use of appetite suppression).

It is respectfully submitted that the references relied on by the Examiner in the rejection do not suggest the claimed new process to which Applicants put the combination of N-acetylcysteine and doxorubicin. Absent that suggestion, a prima facie case of obviousness has not made out under the law.

At best, the Examiner's position is akin to concluding that prevention of metastasis is inherent in the mere use of the combination of doxorubicin and N-acetyl-cysteine. There is no evidence to that affect of record and, importantly, the evidence is the opposite.

In order to establish inherency, that which is inherent must inevitably happen. The mere possibility that it might happen or that it happens occasionally does not establish inherency. A review of the *Freeman et al.* and *Doroshov et al.* references teaches that the potentiation effect noted by *Freeman et al.* does not always happen. If it did happen via

Freeman's experiments at a low dose of doxorubicin, it clearly does not appear to have happened at the high dose. Moreover, *Doroshov et al.* didn't notice a potentiation effect even though *Doroshov et al.* tried or attempted to reconcile his findings with those of *Freeman et al.* *Doroshov et al.* found **no significant difference** in adding N-acetyl-cysteine versus saline. Accordingly, a case of inherency cannot be made out and the Examiner's position must be reversed.

Claim 16; Intravenous Administration

Claim 16 is directed to the method wherein the doxorubicin is administered intravenously. Applicants' specification shows quite clearly that superior results are achieved when the doxorubicin is administered intravenously. (Page 2, lines 17-19). On this point, it should be noted that when the doxorubicin was administered intraperitoneally, the effectiveness of the combined treatment was approximately additive as compared to the single treatments. However, when the doxorubicin was administered intravenously, "the combined effect not only resulted more than additive but even more than a multiplicative." See the result reported in the paragraph bridging pages 11-12. Surely, this difference between intravenous and intraperitoneal administration of the doxorubicin would not have been expected to result in the difference between an additive and a synergistic effect. This difference is important because both *Doroshov et al.* and *Freeman et al.* administered the doxorubicin intraperitoneally, not intravenously. This difference may explain why *Freeman et al.* and *Doroshov et al.* did not note a significant difference in neoplastic effect.

Claim 17: Prevention of Lung Metastases

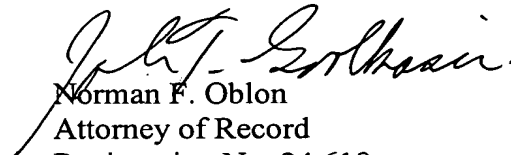
New Claim 17 is directed to the inhibition of lung metastases. It is noted in the specification that DOX is particularly effective with regard to decreasing the number of lung

metastases. See, in particular pages 9 and 10 which indicate that none of the 12 mice which received the combined treatment developed lung metastases. This was a significant drop in frequency of metastasis formation compared to the other groups tested. It is respectfully submitted that there is nothing in the references relied on by the Examiner which indicates the ability of the claim combination to inhibit the formation of lung metastases to the extent noted in the specification. The references of record relied on by Examiner do not even mention metastasis of the lung. Absent some supposed inherency theory, the references cannot anticipate or make the subject matter of Claim 17 obvious.

Appellants respectfully submit that the application is now in condition for allowance, and that the Examiner's rejection should be REVERSED.

Respectfully submitted,

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APPENDIX I: APPEALED CLAIMS

13. A method for inhibiting formation of a metastasis in a patient having a primary cancerous tumor, which has not yet metastasized but is capable of metastasizing, the method comprising administering to said patient N-acetyl-cysteine and doxorubicin together in a synergistic mixture or individually in amounts and within such a period as to act synergistically together to produce a cancer metastasis formation inhibiting effect.

14. The method according to claim 13, wherein the N-acetyl-cysteine is administered in an amount between 100 mg and 6 g per day.

15. The method according to Claim 13, wherein the doxorubicin is administered in an amount between 2 and 10 mg per dose.

16. The method according to Claim 13, wherein said doxorubicin is administered intravenously.

17. The method according to Claim 13, wherein the metastases inhibited are lung metastases.

APPENDIX II: PROPOSED FINDINGS OF FACT

1. The *Doroshow et al.* reference does not specifically mention “metastasis” or “prevention of metastasis.”
2. The *Doroshow et al.* reference states that “N-acetylcysteine does not interfere with anti-neoplastic activity of doxorubicin or with the pharmacokinetics of doxorubicin uptake in the heart or liver.” (p. 1054, col. 1).
3. *Doroshow et al.* administered doxorubicin intraperitoneally. (Page 1054, col. 2) .
4. *Doroshow et al.* did not administer doxorubicin intravenously.
5. *Doroshow et al.* state that the survival patterns of the saline-NAC-pretreated groups receiving doxorubicin were “not significantly different” by the log rank tests. (p. 1060).
6. *Doroshow et al.* found that “NAC did not appear to interfere with the drug’s chemotherapeutic effect in P388 leukemia.” (Page 1062, col. 2)
7. *Doroshow et al.* suggest that “NAC could have its predominant impact on the cardiac damage produced by doxorubicin rather than its anti-neoplastic activity.” (Page 1063, col. 1).
8. *Freeman et al.* does not mention metastases or metastases formation.
9. *Freeman et al.* administered doxorubicin intraperitoneally. (p. 169).
10. *Freeman et al.* administered N-acetyl-cysteine intraperitoneally. (p. 169).
11. *Freeman et al.* did not administer doxorubicin or N-acetyl-cysteine intravenously.
12. Table 1 of *Freeman et al.* shows that at a low dosage of doxorubicin, both cysteamine and N-acetyl-cysteine prolong the “life span” of mice as compared to doxorubicin alone.

13. *Freeman et al.* taught that at higher dosage, neither cysteamine nor N-acetyl-cysteine prolonged the “life span” of mice as compared to doxorubicin alone. (Table 1).

14. *Freeman et al.* taught that cysteamine was superior to N-acetyl-cysteine in prolonging the life span of mice whether combined with low dosage or high dosage doxorubicin. (Table 1)

15. *Freeman et al.* states specifically that “co-current administration of cysteamine for N-acetyl-cysteine did not significantly alter the effects of adriamycin on tumor growth. (p. 173).

16. *Freeman et al.* specifically states that “cysteamine and N-acetyl-cysteine significantly increased the prolongation of life span of animals treated with adriamycin at 1.5 mg/kg/day but not those treated with adriamycin at 2.5 mg/kg/day.” (p. 173)

APPENDIX III: PROPOSED CONCLUSIONS OF LAW

1. Claims 13-17 are not made obvious by the combined teachings of the *Freeman et al.* and *Doroshow et al.* references.

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bankrupt, so that it might be administered under the proceedings in the bankrupt court. Between the first steps initiating proceedings in that court and the appointment of the assignee, a considerable time often passes. During that time, the property of the bankrupt, especially in a case commenced by creditors, may be surreptitiously conveyed beyond the reach of the court of the assignee, to whose possession it should come when appointed. If the bankrupt does not voluntarily aid the court, or is inclined to defeat the proceeding, he can, with the aid of friends or irresponsible persons, sell his movable property and put the money in his pocket, or secrete his goods or remove them beyond the reach of the assignee or the process of the court, and thus defy the law. The evidence in this case shows the manner in which this can be done.

[690] It was the purpose of the Act of Congress to remedy this evil. It, therefore, provides that as soon as the petition in bankruptcy is filed, the court may issue to the marshal a provisional warrant directing him to take possession of all the property and effects of the bankrupt and hold them subject to the further order of the court. To have limited this right or duty of seizure to such property as he might find in the actual possession of the bankrupt would have manifestly defeated in many instances the purpose of the writ. There is, therefore, no such limitation expressed or implied. As in the writ of attachment, or the ordinary execution on a judgment for the recovery of money, the officer is authorized to seize the property of the defendant wherever found; so here it is made his duty to take into his possession the bankrupt's property wherever he may find it. It is made his duty to collect and hold possession until the assignee is appointed or the property is released by some order of court, and he would ill perform that duty if he should accept the statement of every man in whose custody he found property which he believed would belong to the assignee when appointed, as a sufficient reason for failing to take possession of it.

But he does this on his own responsibility for not only a faithful, but a correct, judgment in deciding what property to seize. He is liable to suit if by mistake he takes possession of property not liable to seizure under his warrant.

Such a suit was brought in this case; and we can see no reason why the issue made by the pleadings, namely: the true ownership of the property, should not have been fully submitted to the jury. It was the shortest way to determine the rights of the parties. It was the first time the issue was presented. It was before a court of competent jurisdiction.

To hold that the plaintiffs, by reason of their bare assertion of ownership connected with possession, must recover of the marshal the value of the property, and that the assignee could then have sued plaintiffs and recovered it from them, is a mode of doing justice that does not commend itself to our judgment, even if the assignee could be sure to find a responsible defendant when he came to sue.

[691] We are of opinion that the Court of Appeals of New York was in error in its construction of the bankrupt law and in affirming the instruction of the inferior court.
See 12 Otto.

The judgment of the Superior Court is, therefore, reversed and the case remanded for further proceedings in conformity with this opinion.

True copy. Test:
James H. McKenney, Clerk, Supr. Court, U. S.

Cited—109 U. S., 426, 477.

RICHARD A. TILGHMAN, *Appt.*,

vs.
WILLIAM PROCTOR ET AL.

(See S. C., 12 Otto, 707-735.)

*Patent-right—for a process—subsequent inventor
—Tilghman's patent—decisions explained.*

*1. A patent for a process, irrespective of the particular mode or form of apparatus for carrying it into effect, is admissible under the patent laws of the United States.

2. To sustain a patent for a process, the patentee should be the first and original inventor of the process; should claim it in his patent and, if the means of carrying it out are not obvious to an ordinary mechanic skilled in the art, his specification should describe some mode of carrying it out which will produce a useful result.

3. If a subsequent inventor discover a new mode of carrying out a patented process, though he may have a patent for such new mode, he will not be entitled to use the process without the consent of the patentee thereof.

4. The decision in *Mitchell v. Tilghman* [XXII., 125], reviewed and overruled; and Tilghman's patent relating to the manufacture of fat acids, sustained as a patent for a process.

5. The decisions in *O'Reilly v. Morse*, 15 How., 62, and in the case of Neilson's patent for the hot blast, (Web. Pat. Cas.) commented upon and explained.

[No. 25.]

Argued, Nov. 11, 12, 1880. Decided, Jan. 24, 1881.

APPEAL from the Circuit Court of the United States for the Southern District of Ohio.

The bill in this case was filed in the court below by the appellant, to obtain an injunction and other relief against the alleged infringement of a certain patent. A decree was entered against the complainant; whereupon he appealed to this court.

The case is fully stated in the opinion of the court.

Mr. Geo. Harding, for appellant:

Appellant was the discoverer of the chemical fact that fatty or oily substances would be decomposed, and the fat acids and glycerine separated by the action of water at a high temperature and under pressure; and he was the first to describe a process by which his said discovery could be utilized in the arts, viz.:

The heating of fatty matter and water in proper proportions, in a closed vessel, of sufficient strength to prevent the evaporation of the superheated water.

Having thus described the mechanical means of carrying into effect his discovery, he is entitled to protection, whatever be the form of the closed receptacle or the means of heating it.

O'Reilly v. Morse, 15 How., 62; *Neilson v. Harford*, 1 Web. Pat. Cas., 295; *Corning v. Burden*, 15 How., 287.

Appellant's patent is for a process, and is patentable; it is not for a mere philosophical principle, unapplied to practical use.

Same cases.

*Head notes by Mr. Justice BRADLEY.

The mention of the use of a "convenient vessel," in appellant's patent, is sufficient without a further description or reference to known existing apparatus.

Houshill Co. v. Neilson, 1 Web. Pat. Cas., 637; *Emerson v. Hogg*, 2 Blatchf., 9; *Brooks v. Jenkins*, 3 McLean, 447; *Kneass v. Schuykill Bk.*, 4 Wash. (C. C.), 13; see, Patent Rec. p. 8.

Appellees infringe by the use of highly heated water under pressure, to decompose fat into fat acids and glycerine. Appellant's patent is not limited to specific degrees of temperature.

Mowry v. Whitney, 14 Wall, 636 (81 U. S., XX., 860, 861); *Goodyear v. Wait*, 3 Fish., 248; *Wood Paper Co. v. Glens Falls Co.*, 4 Fish., 324.

Appellees infringe none the less because they insert a small per cent of lime in their digesters. Two processes then go on independently of each other, i. e., the old lime saponification process producing lime and soap, and the infringing process, producing free fat acids and glycerine by the use of superheated water alone.

The mere suggestions of actual and possible modes of operation in prior books or patents, is not sufficient to invalidate a patent for a process reduced to practice and adequately described.

Curt. Pat., sec. 378; *Betts v. Menzies*, 7 Law Times (N. S.), 110; *Houshill Co. v. Neilson*, 1 Web. Pat. Cas., 690.

Appellant's patent is not void for want of practical utility, nor because lower temperatures than those pointed out in the appellant's patent are generally used, nor because there may be inconvenience in working his process at the maximum temperature mentioned by him. *Mowry v. Whitney*, 14 Wall., 646 (81 U. S., XX., 864).

The extension is valid on its face. Its validity cannot be impeached in this suit.

Messrs. Chas. B. Collyer and Matt. H. Carpenter, for appellees:

The defendants do not infringe the patent of the complainant:

First. Because the high temperature and pressure described and employed in the patent is not employed by the defendants, and could not possibly be realized in the form and character of apparatus used by them.

Second. The complainant to prove infringement, must show, not only that the temperature and apparatus, as employed by defendants, are within the compass of his patent; but, that the defendants do in fact decompose fats into fat acids and glycerine, by the sole agency of water in its liquid form.

Tilghman's alleged invention was not new and his patent is, consequently, void.

Tilghman claims a process whereby fat is decomposed by water; he says the vessel must be so closed, etc., as to "prevent the conversion of the water into steam."

His process may, therefore, be briefly termed a "water process."

Whenever the water becomes a mere auxiliary to other forces, as in defendants' process, although it may be essential to their action, the process is not Tilghman's.

In Gay Lussac and Chevreul's patent, water, in a liquid state, at a pressure of several atmospheres, is an essential agent of the decomposition and solution of glycerine, one of the prod-

ucts. Why is not this patent then a distinct anticipation of Tilghman's? Because the water, although essential, is nevertheless merely auxiliary to the other forces, and acts a subordinate part.

And for the same reason the defendants' process does not infringe complainant's process, although water is present as an essential agent.

The defendants having acquired from the patentee the right to use his patented invention during the original term of the patent, are not liable to him under the extension.

The Act of 1836, section 18, providing for renewals of patents, also provides:

"And the benefit of such renewal shall extend to assignees and grantees of the right to use the thing patented to the extent of their respective interests therein."

This saving clause of the statute has been considered repeatedly by the Supreme Court, and its meaning definitely determined. The case of most recent date, in which it has been passed upon in that court, is that of *Bloomer v. Millinger*, 1 Wall., 340 (68 U. S., XVII., 581), and in this case the prior decisions are referred to.

In the case of *Day v. Rubber Co.*, 3 Blatchf., 488, the rights of those who have acquired licenses under the original term of the patent to continue under the extended term, without liability to the patentee, when a process is the subject-matter of the patent, is fully established. Referring to all the reported decisions on the question, *Wilson v. Turner*, 7 Law Rep., 527; *Wilson v. Rousseau*, 4 How., 646; *Wilson v. Simpson*, 9 How., 109, and *Bloomer v. McQueenan*, 14 How., 539.

Mr. Justice Bradley delivered the opinion of the court:

This case involves a consideration of the same patent which was the subject of litigation in the case of *Mitchell v. Tilghman*, reported in 19th Wallace, 287 [86 U. S., XXII., 125]. The evidence in the present case, which is quite an unwieldy mass, is much the same as in that, being supplemented, however, by the testimony of the patentee respecting the nature of his original experiments and the practicability of using profitably the coil apparatus described in the patent, together with certain exhibits relating to the novelty of the alleged invention. Upon the renewed consideration which has been given to the subject, the court is unanimously of opinion, contrary to the decision in the *Mitchell* case, that the patent of Tilghman must be sustained as a patent for a process, and not merely for the particular mode of applying and using the process pointed out in the specification, and that the defendants have infringed it by the processes used by them.

The patent in question relates to the treatment of fats and oils, and is for a process of separating their component parts so as to render them better adapted to the uses of the arts. It was discovered by Chevreul, an eminent French chemist, as early as 1813, that ordinary fat, tallow and oil are regular chemical compounds, consisting of a base which has been termed glycerine, and of different acids, termed generally fat acids, but specifically, stearic, margaric and oleic acids. These acids, in combination severally with glycerine, form stearine, margarine,

[709]

and oleine. They are found in different proportions in the various neutral fats and oils; stearine predominating in some, margarine in others, and oleine in others. When separated from their base (glycerine), they take up an equivalent of water, and are called free fat acids. In this state they are in a condition for being utilized in the arts. The stearic and margoric acids form a whitish, semi-transparent, hard substance, resembling spermaceti, which is manufactured into candles. They are separated from the oleic acid, which is a thin oily fluid, by hydrostatic or other powerful pressure; the oleine being used for manufacturing soap, and other purposes. The base, glycerine, when purified, has come to be quite a desirable article for many uses.

The complainant's patent is dated the third day of October, 1854, and relates back to the 9th day of January of that year, being the date of an English patent granted to the patentee for the same invention. It has but a single claim, the words of which are as follows: "Having now described the nature of my said invention, and the manner of performing the same, I hereby declare that I claim, as of my invention, the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure."

[710]

In the case of *Mitchell*, the majority of the court was of opinion that in the application of the process thus claimed the patentee was confined to the method of using the process particularly pointed out in the specification; and as, by that, it was proposed to produce a very rapid separation of the fatty elements by the use of a high degree of heat, the operation being effected in the space of ten minutes by forcing the fat, mixed with water, through a long coil of strong iron tube passing through an oven or furnace where it was subjected to a temperature equal to that of melting lead, or 612° Fahrenheit, it was concluded by the court that the producing of the same result in a boiler subjected to only 400° Fahrenheit, and requiring a period of several hours to effect the desired separation, was not an infringement of the patent, although the process by which the effect was produced, namely: the action of water, in intimate mixture with the fat, at a high temperature and under a sufficient pressure to prevent the formation of steam, was undoubtedly the same. On further reflection, we are of opinion that, in the case referred to, sufficient consideration was not given to the fact that the patent is for a process, and not for any specific mechanism for carrying such process into effect.

In order to have a clearer understanding of the question, it is necessary to advert briefly to the history of the art, and then to examine the terms of the patent in greater detail.

It is conceded by the complainant that two different processes for effecting a decomposition of fats into their component elements had been in practical operation prior to his invention. These processes were called respectively the alkaline saponification process, and the sulphuric acid distillation process. The first consisted of the manufacture of the fat into soap by the use of lime or other alkali; and then, of the decomposition of the soap, so produced, into the fat acids by the aid of hydrochloric or dilute sulphuric acid. The decomposition of

See 12 Otto.

the soap was, by a subsequent improvement, effected by distillation in an atmosphere of steam. The other process, called the sulphuric acid distillation process, consisted of the direct saponification of fat by means of concentrated sulphuric acid, and the subsequent distillation over of the resulting fatty acids. By this process, however, the glycerine was destroyed.

The first of these processes was patented by Gay Lussac & Chevreul in 1825, but was not brought into successful operation in the manufacture of stearic candles until improved by De Milly in 1831. The second process was proposed and developed between 1840 and 1850. It was extensively used during and after that period by the large manufacturing firm of E. Price & Co., of London, and their successors, Price's Patent Candle Company. Mr. G. F. Wilson, one of the shareholders in that establishment, and apparently a man of accurate knowledge on this subject, read various papers illustrative of the history of the manufacture before learned societies in England, extracts from which are contained in the record, and throw considerable light on the matter. It appears from his statements that the distillation of the saponified fat, whether saponified by an alkali or by sulphuric acid, was often accompanied by prejudicial effects from the access of atmospheric air to the contents of the still. To remedy this, he and his associates adopted and patented the introduction of superheated steam into the still or vat containing the fat acids, which excluded atmospheric air, and carried over the fatty vapors into the receiver in a more perfect condition than they had before been able to obtain them. These patents were taken out in 1843.

[711]

In the following year, the same parties, Gwynne and Wilson, found, what Dubrunfaut had found two or three years before, that palm-oil, which is very fusible and manageable, can be distilled in its crude state, in the manner last described, that is, by the introduction of steam into the still, without the intervention of saponification; and the distilled product being then steam boiled in water, acidulated with sulphuric acid, and the water allowed to settle and separate, the resulting substance would be a fat acid. It is not shown that this process was ever carried into successful operation prior to Tilghman's patent; and judging from what was done by the Price Patent Candle Company in the way of improvement immediately after becoming acquainted with Tilghman's process, it is to be inferred that the steam distillation process, without saponification, was still an unsuccessful experiment when his patent was issued. This experiment, however, must be regarded as the nearest approach to the process of Tilghman of anything done in the art prior to it.

We do not regard the accidental formation of fat acid in Perkin's steam cylinder from the tallow introduced to lubricate the piston, if the scum which rose on the water issuing from the ejection pipe was fat acid, as of any consequence in this inquiry. What the process was by which it was generated or formed was never fully understood. Those engaged in the art of making candles, or in any other art in which fat acids are desirable, certainly never derived the least hint from this accidental phenomenon in regard to any practicable process for manufacturing such acids.

The accidental effects produced in Daniell's water barometer and in Walther's process for purifying fats and oils preparatory to soap making, are of the same character. They revealed no process for the manufacture of fat acids. If the acids were accidentally and unwittingly produced, whilst the operators were in pursuit of other and different results, without exciting attention and without its even being known what was done or how it had been done, it would be absurd to say that this was an anticipation of Tilghman's discovery.

[712]

Nor do we regard the patent of Manicler, which was taken out in 1828, as anticipating the process of Tilghman. It is true that he directs a mixture of fat with about one quarter of its weight of water to be placed in a boiler and subjected to a heat sufficient to create a pressure equal to one atmosphere above the natural atmospheric pressure (or about 250° Fahrenheit); the boiler being provided with a safety-valve which would secure that degree of pressure. But, subject to this pressure, the patent directed that the mixture should be made to boil, and of course that the water should be converted into steam; the words are, "Apply fire to this digester to melt and digest the contained tallow or fat and water and keep up a rapid ebullition during about six hours." It is probable, therefore, that any decomposition of the fat which may have been produced by this process was due to the steam formed and passing through the fat, as no means appears to have been adopted for keeping up the mixture of the fat and water. But we have no evidence that the process was ever successful in practice. One of the defendants' witnesses testifies that he tried it, and though he got some results, he adds this pregnant observation: "To transform all the fat in this way at so low a temperature would have required many days." He only pretends that the sample which he obtained showed by its appearance, as well as by its acid action, that the separation had commenced. Evidently, therefore, this was but an abandoned experiment, since we never hear any more of it from 1826 down to the trial of this cause.

It is unnecessary to examine in detail other alleged anticipations of Tilghman's process. We believe that we have specified the most prominent and reliable instances.

[713]

Tilghman's discovery was made in 1853, and was, in brief, this: That the fat acids can be separated from glycerine, without injury to the latter, by the single and simple process of subjecting the neutral fat, whilst in intimate mixture with water, to a high degree of heat under sufficient pressure to prevent the water from being converted into steam, without the employment of any alkali or sulphuric acid, or other saponifying agent; the operation, even with the most solid fats, being capable of completion in a very few minutes when the heat applied is equal to that of melting lead, or 612° Fahrenheit; but requiring several hours when it is as low as 350° or 400° Fahrenheit. The only conditions are, a constant and intimate commixture of the fat with the water, a high degree of heat, and a pressure sufficiently powerful to resist the conversion of the water into steam. The result is, a decomposition of the fatty body into its elements of glycerine and fat acids, each element taking up the requisite equivalent of water es-

282

sential to its separate existence, and the glycerine in solution separating itself from the fat acids by settling to the bottom when the mixed products are allowed to stand and cool. In this process a chemical change takes place in the fat in consequence of the presence of the water and the active influence of the heat and pressure upon the mixture.

We are satisfied that Tilghman was the original discoverer of this process. His priority was acknowledged at the time by those most interested to question it. Mr. Wilson, to whose statements reference has been made, and who is perhaps more justly entitled than anyone else to claim an anticipation of Tilghman's discovery, makes no such pretension, but, on the contrary, concedes Tilghman's right to priority; and, indeed, Price's Patent Candle Company, of which Mr. Wilson was a member and director, took a license under Tilghman's English patent.

As having some bearing upon the proper construction of the patent in suit, which will presently be more particularly examined, it is proper to observe that Tilghman's actual invention, as demonstrated in his experiments made in 1853, before making any application for a patent, was not confined to the use of a coil of pipe in a heated chamber or furnace for effecting the process which he claims, but was frequently exhibited by using a simple digester, filled nearly full with a mixture of fat and water, and heated in a gas stove, or in a vertical position over a gas lamp; the mixture of fat with the water being kept up by a loose metallic rod or jumper, which thoroughly mixed the contents when the digester was shaken. Sometimes the digester was heated in a horizontal position and, being provided with thin copper partitions fixed inside, was made to revolve in order to cause a more perfect mixture of the materials. In using the digester, it not being provided with a safety valve, a small space was left at the top for the formation of sufficient steam to prevent, by its elasticity, the vessel from exploding.

[714]

In making these experiments Tilghman not only varied the apparatus, but applied different degrees of heat in the operation. The following is his account of some of these proceedings. He says: "Before applying for my patent I had made many experiments in decomposing by water at temperatures below melting bismuth, sometimes in the coil form of apparatus, but most frequently in digesters. The lowest temperature tried by me was three hundred and fifty degrees Fah. (350° F.), or 120 pounds pressure continued for four hours. The digester was as usual in a vertical position, but the heat was in this case given by an oil bath. I obtained both fat acids and glycerine in this experiment, but in such small quantities as to prove that though the decomposition did go on at that heat, yet it was very slow compared with the higher heats. I find notes of another experiment, July 15th, 1854, in the coil apparatus, with palm-oil, made at the melting point of tin, 440° Fah., 360 pounds pressure. It was pumped through the coil very slowly, so as to give about thirty minutes' heat, and found to be partly decomposed, so that it was returned to the inlet end of the apparatus and pumped through a second time at the same rate and heat, which produced perfect decomposition of the palm-oil into fat acids and solution of glyc-

102 U. S.

erine. Ten minutes' exposure would have perfectly decomposed palm-oil at the heat of melting bismuth, 510° F. Yet I found 70° lower heat required six times as long to produce the same effect. I had often decomposed tallow at 510° F. before taking out my patent, not in the coil apparatus, but in the simple vertical digester. In this case I had to allow increased time on account of the imperfect contact of the fat and water in addition to that required by the diminished temperature."

[715] In the course of his testimony, Tilghman explains why, in his patent, he specially recommended the use of the high temperature of melting lead in applying his process to practical use. He says: "Many experiments had shown me that at these higher temperatures the decomposition was carried on with the greatest economy of fuel and cost of apparatus. When in London in 1847, I had found Perkins' house-warming apparatus, consisting of coils of hundreds of feet of pipe, containing water at the temperature of melting lead, had long been in extensive domestic use there. On returning to London in 1853, I found the same apparatus largely used for heating bakers' ovens. As I thus found such heats and pressures were perfectly practical and safe, as well as economical, I thought I was bound to describe my invention in what I then believed to be the best mode of carrying it out, and that, as I was the discoverer of the chemical fats, I could then claim broadly as my process the use of water highly heated and under pressure to decompose fats, no matter what temperature or apparatus was used."

And being asked for his present view as to the practicability, economy and safety of the higher temperatures as compared with lower temperatures, he said: "I think the high-pressure apparatus is much more economical, both in the first cost and in the expense of working. Its principal disadvantage is that ordinary engineers are not familiar with its management, and consequently dislike it."

In December, 1853, Tilghman, having completed his experiments to his own satisfaction, filed a *caveat* in the Patent-Office preparatory to taking out a patent for his invention. In this *caveat* he says: "The invention consists in subjecting animal and vegetable fatty and oily substances containing glycerine to a high temperature and pressure in close vessels, mixed with different agents, according to the effect desired to be produced upon the fatty matter. Thus, when I wish to convert the neutral fatty substances into fatty acids and glycerine, I pump a mixture of the fat and water, under great pressure, through a series of strong metal tubes, kept at about the heat of melting lead, and provided with a cooling-worm and safety-valve at its outlet. The neutral fatty substance is decomposed by the process, and the fat acid and solution of glycerine which issue through the safety-valve separate by settling."

[716] Tilghman soon after repaired to England and took out a patent there, dated the 9th day of January, 1854, and sealed the 25th of March. He immediately put in operation an apparatus for exhibiting his process on a small scale. Mr. Wilson, before mentioned, witnessed his experiments, and this speaks of them in a paper See 12 OTTO.

communicated to the Journal of the Society of Arts, January 25, 1856:

"In January, 1854, Mr. Tilghman, an American chemist, who has studied all that has been published here and in France on the subject of acidification and distillation of fatty bodies, obtained a patent for exposing fats and oils to the action of water at a high temperature and under great pressure, in order to cause the combination of the water with the elements of the neutral fats, so as to produce at the same time free fat acids and solution of glycerine. He proposed to effect this by pumping a mixture of fat and water, by means of a force-pump, through a coil of pipe heated to about 612° Fahrenheit, kept under a pressure of about 2,000 pounds to the square inch; and he states that the vessel must be closed, so that the requisite amount of pressure may be applied to prevent the conversion of water into steam. This is, all must admit, a beautiful, original, chemical idea, well carried out; it has yet to prove how far it can compete successfully with distillation. We have made an arrangement with Mr. Tilghman which will give us the means of testing its commercial merits."

Mr. Wilson goes on to state that this process of Tilghman suggested to them the idea of distilling fats by passing steam into them at a high temperature whereby to resolve them into glycerine and fat acids. They found the plan successful, and that the glycerine distilled over with the fat acids, but no longer combined with them; and, in July, 1854, they took out a patent for that process. In a paper read before the Glasgow meeting of the British Association for the Advancement of Science, in September, 1855, Mr. Wilson thus refers to the course of discovery which took place in this branch of manufacture:

"By our first improvement in separating the fat acids from neutral fats, the glycerine was decomposed by the direct action of concentrated sulphuric acid at a high temperature, and all that remained of it was a charred precipitate. A new process for decomposing neutral fats by water under great pressure coming under our notice" (referring to Tilghman's process) "led us to look again more closely into our old distilling processes, and the doing this showed, what we had often been on the brink of discovering, that glycerine might be distilled."

In our new process the only chemical agents employed for decomposing the neutral fat, and separating its glycerine, are steam and heat; and the only agents used in purifying the glycerine thus obtained are heat and steam; thus all trouble from earthy salts or lead is escaped.

Distillation, however, purifies the impure glycerine of the old sources.

On the table is a series of products of palm-oil, which will serve to illustrate the process. Steam, at a temperature of from 550° to 600° Fah., is introduced into a distillery apparatus containing a quantity of palm-oil. The fatty acids take up their equivalents of water, and the glycerine takes up its equivalent; they then distill over together. In the receiver the condensed glycerine, from its higher specific gravity, sinks below the fat acids.

We quote more fully from this paper, be-

cause it is a contemporary acknowledgment, made by a man who stood in the front rank of those who understood and whose interest it was to understand the most advanced process of resolving fats and oils into their component parts, that Tilghman's "process for decomposing neutral fats by water under great pressure" was "a new process;" and who, with his associates, took hints from it for making new departures and improvements in the art. The statements of Mr. Wilson on this subject are corroborated by other witnesses. Indeed, nearly all those competent to speak on the subject state or admit that the process of decomposing fats into glycerine and fat acids by mixing them with water and subjecting the mixture to a high degree of heat under a pressure sufficient to prevent the conversion of the water into steam, was not known in the arts prior to Tilghman's discovery. The testimony of some experts to the contrary is based upon their construction of certain patents and publications produced in evidence, the most important of which have already been adverted to.

The question then arises: has Tilghman secured the exclusive right to the process of which he was thus the inventor?

[718] An examination of the patent itself, which the preceding remarks will enable us better to understand, will show, we think, that it was intended to and does cover and secure to the patentee the general process which has been described, although only one particular method of applying and using it is pointed out.

The specification describes the invention as follows:

"My invention consists of a process for producing free fat acids and solution of glycerine from those fatty and oily bodies of animal and vegetable origin which contain glycerine as their base. For this purpose, I subject these fatty or oily bodies to the action of water at a high temperature and pressure, so as to cause the elements of those bodies to combine with water, and thereby obtain at the same time free fat acids and solution of glycerine. I mix the fatty body to be operated upon with from a third to a half of its bulk of water, and the mixture may be placed in any convenient vessel in which it can be heated to the melting point of lead, until the operation is complete. The vessel must be closed and of great strength, so that the requisite amount of pressure may be applied to prevent the conversion of the water into steam.

The process may be performed more rapidly and also continuously by causing the mixture of fatty matter and water to pass through a tube or continuous channel, heated to the temperature already mentioned: the requisite pressure for preventing the conversion of water into steam being applied during the process; and this I believe is the best mode of carrying my invention into effect. In the drawing hereunto annexed are shown figures of an apparatus for performing this process speedily and continuously, but which apparatus I do not intend to claim as any part of my invention."

The specification then goes on to describe, by the aid of the drawing referred to, the particular device mentioned. But it is evident, and indeed is expressly announced, that the process claimed does not have reference to this particu-

lar device, for the apparatus described was well known, being similar to that used for producing the hot-blast and for heating water for the purpose of warming houses. It consists of a coil of iron pipe or other metallic tubing erected in an oven or furnace, where it can be subjected to a high degree of heat; and through this pipe the mixture, of nearly equal parts of fat and water, made into an emulsion in a separate vessel by means of a rapidly vibrating piston or dasher is impelled by a force-pump in a nearly continuous current, with such regulated velocity as to subject it to the heat of the furnace for a proper length of time to produce the desired result; which time, when the furnace is heated to the temperature of 612° Fah., is only about ten minutes. The fat and water are kept from separating by the vertical position of the tubes, as well as by the constant movement of the current; and are prevented from being converted into steam by weighting the exit valve by which the product is discharged into the receiving vessel, so that none of it can escape except as it is expelled by the pulsations produced by the working of the force-pump. Before arriving at the exit valve, the pipe is passed, in a second coil, through an exterior vessel filled with water, by which the temperature of the product is reduced. After the product is discharged into the receiving vessel, it is allowed to stand and cool until the glycerine settles to the bottom and separates itself from the fat acids. The latter are then subjected to washing and hydraulic pressure in the usual way.

After describing this apparatus it is added:

"Although the decomposition of the neutral fats by water takes place with great quickness at the proper heat, yet I prefer that the pump should be worked at such a rate, in proportion to the length or capacity of the heating tubes, that the mixture, while flowing through them, should be maintained at the desired temperature for ten minutes before it passes into the refrigerator or cooling part of the apparatus."

It is evident that the passing of the mixture of fat and water through a heated coil of pipe standing in a furnace is only one of several ways in which the process may be applied. The patentee suggests it as what he conceived to be the best way, apparently because the result is produced with great rapidity and completeness. But other forms of apparatus, known and in public use at the time, can as well be employed without changing the process. A common digester or boiler can evidently be so used, provided proper means are employed to keep up the constant admixture of the water and fat, which is a *sine qua non* in the operation. Tilghman himself, as we have seen, often used such digesters in making his experiments before applying for his patent; and, in putting up machinery for his licensees after his patent was obtained, he did the same thing when the parties desired it. Yet surely the identity of the process was not changed by thus changing the form of apparatus. No great amount of invention was required to adapt different forms of well-known apparatus to the application of the process. The principal difficulty would be in providing an internal arrangement in the boiler, or digester, for successfully keeping up the intimate commixture of the fat and water. It is

evident that this could be accomplished by means of revolving reels armed with buckets, or of a force-pump constantly transferring the heavy stratum of water from the bottom of the mass to the top, aided by horizontal diaphragms partially sectionizing the digester. These devices were resorted to by Tilghman and others when they used a boiler instead of a coil of pipe.

Whilst Tilghman in his patent recommends the high degree of heat named, he does not confine himself to that. It had been fully developed in his experiments, and was well known to him, that a lower degree of heat could be employed by taking longer time to perform the operation; and this would be necessary when boilers or digesters of considerable size were used instead of the coil of pipe, on account of the decreasing power of large vessels to resist the internal pressure. The specification, after describing the use of a metallic coil of pipe, proceeds to add:

"The melting point of lead has been mentioned as the proper heat to be used in this operation, because it has been found to give good results. But the change of fatty matters into fat acid and glycerine takes place with some materials, such as palm-oil, at or below the melting point of bismuth (510° Fah.); yet the heat has been carried considerably above the melting-point of lead without any apparent injury, and the decomposing action of the water becomes more powerful as the heat is increased. By starting the apparatus at a low heat, and gradually increasing it, the temperature giving products most suitable to the intended application of the fatty body employed can easily be determined."

[721] Now when we find it stated, as we do in this specification, that the patentee subjects "fatty or oily bodies to the action of water at a high temperature and pressure, so as to cause the elements of those bodies to combine with water;" that "the mixture may be placed in any convenient vessel in which it can be heated to the melting point of lead, until the operation is complete;" that "the vessel must be closed and of great strength, so that the requisite amount of pressure may be applied to prevent the conversion of the water into steam;" that "the decomposition of the neutral fats by water takes place with great quickness at the proper heat;" that "the melting point of lead has been mentioned as the proper heat to be used in this operation, because it has been found to give good results;" that "the change of fatty matters into fat acid and glycerine takes place with some materials at or below the melting point of bismuth;" that "the decomposing action of water becomes more powerful as the heat is increased;" that, "by starting the apparatus at a low heat and gradually increasing it, the temperature giving products most suitable to the intended application of the fatty body employed can easily be determined;" and when we then find that the patentee categorically claims, in general terms, as his invention "*The manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure;*" and being satisfied that he was, in fact, the inventor of the general process described and bodied forth in the specification, how can we, by any fair rule of construction, circumscribe this claim in such a manner as that it shall only cover the

See 12 Otto.

process when applied in the use of a coil of pipe heated to 612° Fahrenheit? Or, if we allow it to embrace any "convenient vessel," and do not confine it to a coil of pipe, how can we confine it to a particular degree of heat? What did Tilghman discover? And what did he, in terms, claim by his patent? He discovered that fat can be dissolved into its constituent elements by the use of water alone under a high degree of heat and pressure; and he patented the process of "manufacturing fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure." Had the process been known and used before, and not been Tilghman's invention, he could not then have claimed anything more than the particular apparatus described in his patent; but being the inventor of the process, as we are satisfied was the fact, he was entitled to claim it in the manner he did.

[722]

That a patent can be granted for a process, there can be no doubt. The patent law is not confined to new machines and new compositions of matter, but extends to any new and useful art or manufacture. A manufacturing process is clearly an art, within the meaning of the law. Goodyear's patent was for a process, namely, the process of vulcanizing India rubber by subjecting it to a high degree of heat when mixed with sulphur and a mineral salt. The apparatus for performing the process was not patented, and was not material. The patent pointed out how the process could be effected, and that was deemed sufficient. Neilson's patent was for the process of applying the hot-blast to furnaces by forcing the blast through a vessel or receptacle situated between the blowing apparatus and the furnace, and heated to a red heat; the form of the heated vessel being stated by the patent to be immaterial. These patents were sustained after the strictest scrutiny and against the strongest opposition.

On the subject of patents for processes, Mr. Justice Grier, in delivering the opinion of this court in *Corning v. Burden*, 15 How., 267, said: "A process *eo nomine* is not made the subject of a patent in our Act of Congress. It is included under the general term, 'useful art.' An art may require one or more processes in order to produce a certain result or manufacture. The term 'machine' includes every mechanical device or combination of mechanical powers and devices to perform some function or to produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods or operations are called processes. A new process is usually the result of a discovery, a machine of invention. The arts of tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores, and numerous others, are usually carried on by processes as distinguished from machines. One may discover a new and useful improvement in the process of tanning, dyeing, etc., irrespective of any particular form of machinery or mechanical device. And another may invent a labor-saving machine, by which the operation or process may be performed, and each may be entitled to his patent. As, for instance, A has discovered that by exposing India rubber to a certain degree of heat, in mixture or connection with cer-

[723]

tain metallic salts, he can produce a valuable product or manufacture; he is entitled to a patent for his discovery, as a process or improvement in the art irrespective of any machine or mechanical device. B, on the contrary, may invent a new furnace or stove or steam apparatus, by which this process may be carried on with much saving of labor and expense of fuel, and he will be entitled to a patent for his machine as an improvement in the art."

Neilson's patent above referred to had some features very similar to those of Tilghman's. The strong objection urged against the latter is, that the particular apparatus described in the specification is not that which is generally used, and that it cannot be used with much profit or success in large manufacturing operations; whereas, the slower method of dissolving fats in a common boiler or digester at a lower temperature even than that of melting bismuth, which is not described in the specification, is the one which is generally adopted. Precisely this circumstance existed in reference to the patent of Neilson. The specification directed that the blast or current of air produced by the blowing apparatus should be passed into an air vessel or receptacle heated to a red heat, and from thence into the furnace. Then, after stating that the air vessel or receptacle should be increased in size according to the size of the forge or furnace to be supplied, the specification adds: "The form or shape of the vessel or receptacle is immaterial to the effect, and may be adapted to the local circumstances or situation." Now, the most simple and natural form of an air vessel, for heating the blast, as here directed, would be a box or chamber, or a cylindrical vessel; but it turned out in practice that a receptacle of this kind would answer the purpose but very imperfectly; and that the best and most useful method was to heat the blast in a series of tubes placed in a heated oven. This was held to be no ground for invalidating the patent, or for preventing it from covering intermediate tubes, as well as an intermediate box or chamber, the jury being of opinion that a man of ordinary skill and knowledge in the construction of blowing and air-heating apparatus would be able, from the information contained in the specification, to erect a machine which would answer some beneficial purpose in the application of the process, and would not be misled and prevented from so doing by the declaration that the form or shape of the vessel or receptacle was immaterial to the effect. In this view of the subject, the patent was sustained after very great consideration.

Some question has, indeed, been made whether Neilson's patent was sustained as a patent for a process. The Court of Exchequer, in reviewing the proceedings at the trial, and answering the objection that it was a patent for a principle, said: "It is very difficult to distinguish it from the specification of a patent for a principle, and this at first created in the minds of some of the court much difficulty; but, after full consideration, we think that the plaintiff does not merely claim a principle, but a machine embodying a principle, and a very valuable one. We think the case must be considered as if, the principle being well known, the plaintiff had first invented a mode of applying it by a mechanical apparatus to furnaces; and his invention consists in this—

286

the blowing apparatus and the furnace. In this receptacle he directs the air to be heated by the application of heat externally to the receptacle, and thus he accomplishes the object of applying the blast which was before of cold air, in a heated state to the furnace." *Neilson v. Thompson*, Web. Pat. Cas., 275, 371.

In this passage, we think that the Court of Exchequer (who spoke through Baron Parke) drew the true distinction between a mere principle, as the subject of a patent, and a process by which a principle is applied to effect a useful result. That a hot-blast is better than a cold-blast for smelting iron in a furnace was the principle or scientific fact discovered by Neilson; and yet, being nothing but a principle, he could not have a patent for that. But having invented and practically exemplified a process for utilizing this principle, namely: that of heating the blast, in a receptacle, between the blowing apparatus and the furnace, he was entitled to a patent for that process, although he did not distinctly point out all the forms of apparatus by which the process might be applied; having, nevertheless, pointed out a particular apparatus for that purpose, and having thus shown that the process could be practically and usefully applied. Another person might invent a better apparatus for applying the process than that pointed out by Neilson, and might obtain a patent for such improved apparatus; but he could not use the process without a license from Neilson. His improved apparatus would, in this respect, stand in a relation to the process analogous to that which an improvement on a patented machine bears to the machine itself.

That Neilson's patent was regarded as for a process is apparent from what is said by the Judges who had it under consideration. Thus Baron Parke at the trial had said: "The specification and patent together make it clear what the discovery was; it was the introduction of hot air by means of heating it before it was introduced into the furnace, between the blowing apparatus and the furnace." Web. P. C., 312. And when the matter came before the House of Lords, after a trial in Scotland, Lord Campbell said: "After the construction first put upon it (the patent) by the learned Judges of the Court of Exchequer, sanctioned by the high authority of my noble and learned friend now upon the woolsack, when presiding in the Court of Chancery, I think the patent must be taken to extend to all machines, of whatever construction, whereby the air is heated immediately between the blowing apparatus and the blast furnace. That being so, the learned Judge was perfectly justified in telling the jury that it was unnecessary for them to compare one apparatus with another, because, confessedly, that system of conduit pipes was a mode of heating air by an intermediate vessel between the blowing apparatus and the blast furnace, and, therefore, it was an infraction of the patent." *Househill v. Neilson*, Web. Pat. Cas., 715.

This case of the not-blast was commented upon in the great case of *O'Reilly v. Moore*, reported in 15th How., 62-116, and is there recognized and approved in the opinion of this court delivered by Chief Justice Taney. After quoting the remarks of Baron Parke in the Court of Exchequer, cited above, the Chief Justice says: "We see nothing in this opinion differing

102 U. S.

[724]

724

[726] in any degree from the familiar principles of law applicable to patent cases. Neilson claimed *no particular mode* of constructing the receptacle, or of heating it. He pointed out the manner in which it *might* be done; but admitted that it might also be done in a variety of ways, and at a higher or lower temperature; and that all of them would produce the effect in a greater or less degree, provided the air was heated by passing through a heated receptacle. * * * Whoever, therefore, used this method of throwing hot air into the furnace, used *the process* he had invented, and thereby infringed his patent, although the form of the receptacle or the mechanical arrangements for heating it might be different from those described by the patentee. For whatever form was adopted for the receptacle, or whatever mechanical arrangements were made for heating it, the effect would be produced in a greater or less degree, if the heated receptacle was placed between the blower and the furnace, and the current of air passed through it. * * * The patent was supported because he (Neilson) had invented a mechanical apparatus by which a current of hot air, instead of cold, could be thrown in. And this new method was protected by the patent. The interposition of a heated receptacle *in any form* was the novelty he invented." *O'Reilly v. Morse*, 15 How., 115, 116.

We have quoted these remarks of the *Chief Justice* more fully because they show most clearly that he put the same construction upon Neilson's patent that was put upon it by Lord Campbell, and that he fully acquiesced in the legality and validity of a patent for a process. Yet it has been supposed that the decision in *O'Reilly v. Morse* was adverse to patents for mere processes. The mistake has undoubtedly arisen from confounding a patent for a process with a patent for a mere principle. We think that a careful examination of the judgment in that case will show that nothing adverse to patents for processes is contained in it. The eighth claim of Morse's patent was held to be invalid, because it was regarded by the court as being not for a process, but for a mere principle. It amounted to this, namely: a claim of the exclusive right to the use of electro-magnetism as a motive power for making intelligible marks at a distance; that is, a claim to the exclusive use of one of the powers of nature for a particular purpose. It was not [727] a claim of any particular machinery, nor a claim of any particular process for utilizing the power but a claim of the power itself; a claim put forward on the ground that the patentee was the first to discover that it *could* be thus employed. This claim the court held could not be sustained.

That this was the true ground of the decision will be manifest from the following observations of the *Chief Justice* in the opinion already quoted from. He says: "He (Morse) claims the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs or letters at a distance. If this claim can be maintained, it matters not by what *process* or *machinery* the result is accomplished. For aught that we now know, some future inventor, in the onward march of science, may discover a mode of writing or printing at a distance by means of the electric

or galvanic current, without using any part of the process or combination set forth in the plaintiff's specification. * * * In fine, he claims an exclusive right to use a *manner and process* which he has not described, and indeed had not invented, and therefore could not describe when he obtained his patent. The court is of opinion that the claim is too broad, and not warranted by law. * * * It is the high praise of Professor Morse that he has been able by a new combination of known powers, of which electro-magnetism is one, to discover a method by which intelligible marks or signs may be printed at a distance. And for the method or process thus discovered he is entitled to a patent. But he has not discovered that the electro-magnetic current, used as a motive power, in any other method and with any other combinations, will do as well." After reviewing the statutes and decisions bearing upon the subject, the *Chief Justice* makes a summary conclusion of the whole matter, as follows: "whoever discovers that a certain useful result will be produced, in any art, machine, manufacture or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact that anyone skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void. And if it can be done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes, and nothing more. And it makes no difference, in this respect, whether the effect is produced by chemical agency or combination; or by the application of discoveries or principles in natural philosophy, known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case, he must describe *the manner or process* as above mentioned, and the end it accomplishes. And anyone may lawfully accomplish the same end without infringing the patent, if he uses means substantially different from those described." *O'Reilly v. Morse*, 15 How., 119.

It seems to us that this clear and exact summary of the law affords the key to almost every case that can arise. "Whoever discovers that a certain useful result will be produced in any art by the use of certain means is entitled to a patent for it, provided he specifies the means." But everything turns on the force and meaning of the word "means." It is very certain that the means need not be a machine, or an apparatus; it may, as the court says, be a *process*. A machine is a thing. A process is an act, or a mode of acting. The one is visible to the eye; an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed. Either may be the means of producing a useful result. The mixing of certain substances together, or the heating of a substance to a certain temperature, is a process. If the mode of doing it or the apparatus in or by which it may be done is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough, in the patent, to point out the process to be performed, without giving supererogatory

directions as to the apparatus or method to be employed. If the mode of applying the process is not obvious, then a description of a particular mode by which it may be applied is sufficient. There is, then, a description of the process and of one practical mode in which it may be applied. Perhaps the process is susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is

[729]

not bound to describe them all in order to secure to himself the exclusive right to the process, if he is really its inventor or discover. But he must describe some particular mode, or some apparatus, by which the process can be applied with at least some beneficial result, in order to show that it is capable of being exhibited and performed in actual experience.

Let us apply these principles to the present case. In the first place, the claim of the patent is not for a mere principle. The chemical principle or scientific fact upon which it is founded is, that the elements of neutral fat require to be severally united with an atomic equivalent of water in order to separate from each other and become free. This chemical fact was not discovered by Tilghman. He only claims to have invented a particular mode of bringing about the desired chemical union between the fatty elements and water. He does not claim every mode of accomplishing this result. He does not claim the lime saponification process, nor the sulphuric acid distillation process, and if, as contended, the result was accomplished by Dubrunfaut, Wilson and Scharling, by means of steam distillation, he does not claim that process. He only claims the process of subjecting to a high degree of heat a mixture continually kept up, of nearly equal quantities of fat and water in a convenient vessel strong enough to resist the effort of the mixture to convert itself into steam. This is most certainly a process. It is clearly pointed out in the specification, and one particular mode of applying it and carrying it into effect is described in detail. But it is not the particular apparatus described which Tilghman desires to secure by his patent. Having pointed out the process and suggested a particular mode of applying it, he claims as his invention "*the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure.*" The true construction of this claim is to be sought by comparing it, as we have already done, with the context of the specification; with the statement of the patentee that his "invention consists of a process for producing free fat acids and solution of glycerine from those fatty and oily bodies of animal and vegetable origin, which contain glycerine as a base;" that "for this purpose he subjects these fatty and oily bodies to the action of water at a high temperature and pressure, so as to cause the elements of those bodies to combine with water and thereby obtain at the same time free fat acids and solution of glycerine;" that he "mixes the fatty body to be operated upon with from a third to a half of its bulk of water, and the mixture may be placed in any convenient vessel in which it can be heated to the melting point of lead" (which is afterwards explained to be only desirable for a quick result, not essential); that "the vessel must be closed and of great strength, so that the requisite amount of pressure may be applied to pre-

[730]

288

vent the conversion of the water into steam." This is the process which the patentee claims to have invented; and this description of it gives the proper construction and qualification to the claim.

It is objected that the particular apparatus described in the patent for carrying the process into effect cannot be operated to produce any useful result. We have examined the evidence on this point, and are satisfied that it shows the objection to be unfounded. A recapitulation of this evidence is not necessary. The testimony of Tilghman himself, of Professor Booth and of Mr. Wilson is directly to the point.

It only remains that we should express our views on the question of infringement. The defendants advance several reasons for the purpose of showing that their process does not conflict with that of Tilghman. First, because they do not use the apparatus described in the complainant's patent; but use a boiler in which the charge of fat and other materials is placed and heated; and do not mix the fat and water in the manner pointed out in the specification of the patent but, on the contrary, have inserted in the boiler a pump which forces the water as it settles to the bottom upwards to the top of the mass and pours it upon the upper surface, whence it again finds its way down through the fat, thus keeping up a constant mixture. It is unnecessary to add anything further on the subject of the form of the apparatus used. The patentee is not confined to a metallic coil of pipe heated in a furnace; but his patent extends to and embraces any convenient vessel for holding the mixture, which is strong enough to sustain the pressure necessary to prevent the water from being converted into steam. The defendants use such a vessel, and use it for the purpose indicated and pointed out in the patent. The vessel which they use has the requisite strength to prevent the water from being converted into steam, and does effect that object. And as to the defendants' using a different method from that suggested in the patent for keeping up the mixture of fat and water, that is of no consequence. The keeping up of the mixture is the important thing. That is a necessary part of the process. They employ such a device for effecting this as is adapted to the form of vessel in which they heat the material. Using a boiler instead of a coil of pipe for this purpose, they are obliged to employ an additional or modified means for keeping up the mixture. They only employ such means as, in view of the change adopted in the form of the heating apparatus, and of the known appliances in use in analogous processes, would naturally suggest themselves to a mechanic skilled in the art. Or, if the mode of effecting the continued mixture adopted by the defendants should be deemed a new and useful improvement, they might perhaps have a patent for that peculiar device without being entitled to use Tilghman's process, on which it is but an improvement.

[731]

Another ground on which the defendants argue that they do not infringe the patent is, that they do not, in their process, use water alone in admixture with fat, but use also some portion of lime: that they formerly used seven per cent of lime, and now use four per cent. But they do not use lime in the manner and to the extent in which it is used for dissolving fats by the

102 U. S.

saponifying process. That requires twelve or fourteen per cent. Even if the saponifying process partly takes place, they use Tilghman's process for effecting the balance of the operation. They use water in admixture with fat, heated to a high degree, far above the boiling point, and yet subjected to such pressure as to prevent the water from being converted into steam; and though they may also use other things at the same time, which other things may facilitate the operation, or render a less degree of heat necessary than would be required when water alone is used, and thus actually improve the process of Tilghman, yet this process is included in their operation and forms the basis of it. It is idle, therefore, to say that they do not infringe Tilghman's patent. It is unnecessary to determine what precise part the lime used by the defendants plays in their process; whether, as the complainant contends, it saponifies the fat to a certain extent, leaving the remainder to be acted upon by the water alone purely after the process of Tilghman; or whether, as the defendants contend, the lime produces a more perfect and active commixture of the fat and water, or predisposes the fat to unite with the requisite elements of water necessary for producing glycerine and the fat acids, in either case the process of Tilghman, modified or unmodified by the supposed improvement, underlies the operation performed in the defendants' boilers.

Another ground assumed by the defendants to avoid the charge of infringement is, that they do not heat the mixed mass in the manner pointed out in Tilghman's specification; but, instead of heating the containing vessel by an outside application of heat, they heat the contents by the introduction of super-heated steam. But we think that this does not alter the essential character of the process. The heating by steam is clearly an equivalent method to that of heating by an external fire. The patent does not prescribe any particular method of applying the heat, except when using the pipe and coil apparatus described in the specification; and, even in the use of this apparatus, the outward application of the heat to the pipe is suggested incidentally and as a matter of convenience rather than as an essential requisite. The patentee showed one method in which the heat could be applied. That was all that was necessary for him to do. If it could be applied in any number of different methods, it would not affect the validity of the patent as a patent for a process. The method of heating the mixture by the introduction of steam may be attended with some beneficial results, in producing an agitation, or automatic circulation helpful to the perfection of the admixture of the water and fat; and so far it may be an improvement on heating from without. Suppose this to be so, as before said, the introduction of an improvement gives no title to use the primary invention upon which the improvement is based.

Finally, the defendants argue that they only use a low degree of heat and pressure compared with that pointed out by the patent, namely: only about 310° Fahrenheit instead of 612°. The precise degree of heat, as we have seen, is not of the essence of the patent. The specification only claims that a high degree of heat, such as would be sufficient to melt lead, is most effective.

See 12 Otto.

U. S., Book 26

ive and rapid in producing the desired result; but suggests a trial of the apparatus employed with different degrees of heat so as to ascertain that which is best for each particular kind of fat. "By starting the apparatus," the language is, "at a low heat, and gradually increasing it, the temperature giving products most suitable to the intended application of the fatty body employed can easily be determined." It is probably true, as contended for by the defendants, that by the use of a small portion of lime, the process can be performed with less heat than if none is used. It may be an improvement to use the lime for that purpose; but the process remains substantially the same. The patent cannot be evaded in that way. The matter may be stated thus: Tilghman discovers a process of decomposing fats by mixing them with water, and heating the mixture to a high temperature under a pressure that prevents the formation of steam. It is a new process, never known before. The defendants seeing the utility of the process, and believing that they can use a method somewhat similar without infringing Tilghman's patent, put a little lime into the mixture, and find that it helps the operation, and that they do not have to use so high a degree of heat as would otherwise be necessary. Still, the degree of heat required is very high, at least a hundred degrees above the boiling point; and a strong boiler or vessel is used in order to restrain the water from rising into steam. Can a balder case be conceived of an attempted evasion and a real infringement of a patent?

And as to the low degree of heat used in the operations of the defendants, this must also be said: that, with the reduction of the temperature, the time of perfecting the operation is more than proportionally increased. Tilghman was aware of this result, and pointed it out in his patent. He expressly says: "The decomposing action of the water becomes more powerful as the heat is increased." What can be done in minutes by the application of a very high degree of heat, requires hours to do at the temperature used by the defendant. But the process is still the same, and the defendants fail to evade the patent.

We pass by the fact that the defendants first took a license from the patentee, and under it and under his directions erected substantially the same apparatus which they are yet using. Receiving what they regarded as additional light, they refused to continue the payment of a royalty, and put the complainant to his legal remedy.

It is our opinion that the patent is for a process, that it is a valid patent, and that the defendants infringe it.

We have considered the case entirely upon its merits. It is unnecessary to bestow much discussion upon the technical objections that have been raised. They have not been pressed in the argument, and are probably not seriously relied on. One of them is, that no replication was filed in the case. To this it may be answered, that the parties have throughout treated the case as though it were regularly at issue. The various stipulations into which they have entered, with regard to the admission of evidence to be heard on the trial of the cause, are totally inconsistent with the idea that the case was to be heard merely on bill and answer. Another

289

[732]

[733]

[734]

objection is, that the patent was dated more than six months prior to the filing of the application for it. But under the law then in force, 1854, with regard to the antedating of patents where a foreign patent had been obtained, this was admissible. The 6th section of the Act of March 3d, 1839, entitled "An Act in Addition to an Act to Promote the Progress of the Useful Arts," expressly declared "that no person shall be debarred from receiving a patent for any invention or discovery * * * by reason of the same having been patented in a foreign country more than six months prior to his application; *Provided*, That the same shall not have been introduced into public and common use in the United States prior to the application for such patent; *And provided also*, That in all cases every such patent shall be limited to the term of fourteen years from the date or publication of such foreign letters-patent." Now, we know by the proceedings on the application in this case that the attention of the Commissioner of Patents was expressly called to the fact of the issuing of the English patent, and that the question of the date of the patent in suit was submitted to and considered by him. Under the laws then in force, he determined that the patent ought to be antedated as of the date of the English patent. It must be presumed that his decision was right according to the facts of the case, at least until the contrary is shown; and nothing has been shown to the contrary by any evidence in the cause to which our attention has been called.

The decree of the Circuit Court is reversed, and the cause remanded with directions to enter a decree in conformity with this opinion.

True copy. Test:

James H. McKenney, Clerk, Sup. Court. U. S.

Cited—7 Sawy., 359.

JAMES S. TRIMBLE *Appt.*,

v.

JOSHUA WOODHEAD ET AL.

(Sec S. C., 12 Otto, 647-650.)

Bankrupt law—rights of assignee.

1. Rights to property fraudulently transferred by a bankrupt, pass to his assignee in bankruptcy, and a creditor of the bankrupt cannot assert them in his own name.

2. The failure of the assignee to sue within two years does not transfer his right of action to a creditor.

[No. 127.]

Submitted Dec. 8, 1880. Decided Jan. 31, 1881.

APPEAL from the Circuit Court of the United States for the District of Kentucky.

The case is fully stated by the court.

Messrs. J. G. Carlisle and James O'Hara, Jr., for appellant.

Messrs. Stanley Matthews and Wm. M. Ramsey, for appellees.

Mr. Justice Miller delivered the opinion of the court:

The appellant, who was plaintiff below, brought his bill in chancery in the Circuit Court for the District of Kentucky and, after hearing on bill, answer, replication and evidence, it was dismissed.

299

The substance of the bill is that Joshua Woodhead was largely indebted to him for government bonds and money loaned for which he had recovered judgments that had proved unavailing; that Ann Woodhead, the wife of Joshua, held the legal title to certain valuable real estate, on which was a flouring mill and other improvements. That the land was purchased by Joshua's money, and the title made to Ann with intent to defraud the creditors of Joshua; and that valuable improvements had been placed on the land, the payment for which was made by Joshua's money. The prayer of the bill was to subject this land to sale for the payment of plaintiff's judgment. [648]

The answer of Ann denied all this, and also set up as a bar to the relief prayed a former suit in one of the state courts concerning the same subject between the same parties. The record of the proceedings in the state court is set out in full, and much evidence on both sides as to the main allegation of fraud alleged in the bill in the present suit is found in the record, all of which, in the view we take of the case, is immaterial.

The defendant, Joshua, answered "that long before the bringing of this suit this defendant had filed his petition in this honorable court under the bankrupt law of the United States, and the said orator, the said James S. Trimble, was duly notified of the same, and the claim of the said orator was therein set forth, and after the proper proceedings as prescribed in said law, this defendant was on his petition adjudged a bankrupt, and by a judgment of this court he was finally discharged from all of his indebtedness, and the claim of the orator was one of the debts from which he was thus discharged; he files herewith a copy of his judgment of discharge as part hereof."

The proceedings in bankruptcy are not found in this record, nor have we been able to find in it a copy of Woodhead's discharge; but the answer of Woodhead is sworn to. The plaintiff also filed an amended bill, in which he makes John T. Levis, a defendant, whom he alleges to be assignee in bankruptcy of the defendant, Joshua. He says in this amended bill that the judgment recovered by him in the state court was obtained after the discharge of said Woodhead as a bankrupt.

It may, therefore, be accepted as established by the pleading that Woodhead was regularly discharged of all his debts by proceedings in bankruptcy, and that in those proceedings John T. Levis was made the assignee with the usual effect of such an appointment. [649]

It is as well to observe here that while the amended bill of plaintiff made Levis a defendant in his character of assignee, and the record shows an order of court for process to issue against him no such process, nor any other notice to him, nor any appearance by him or for him is found in the record. As to him, therefore, and the rights represented by him, the bill is of no effect.

The case of *Glenny v. Langdon*, 98 U. S., 20 [XXV., 43], conclusively establishes the proposition that the rights asserted in this bill passed to the assignee in bankruptcy of Woodhead, and that a creditor of Woodhead cannot assert them in his own name.

In that case the plaintiff sought to avoid
102 U. S.

U. S. 4)

EIBEL PROCESS CO. v. MINNESOTA & ONTARIO PAPER CO.

(Argued Jan. 5-8, 1923. Decided Feb. 19, 1923.)

No. 178.

1. Patents \Rightarrow 328-845,224, claims 1-3, 7, 8, 12, for improvement in paper-making machine, held valid and infringed.

The Eibel patent, No. 845,224, claims 1-3, 7, 8, 12, for an improvement in the Fourdrinier paper-making machine, which consisted essentially in placing the wire at such a slope that the flow of the stock by gravity would equalize the speed of the wire, so that the wire could be run at a higher rate of speed and still produce good paper, held to disclose invention in the discovery of the cause previously limiting the speed of the machine and of the means for removing the cause.

2. Patents \Rightarrow 62—Oral evidence to prove anticipation must be clear and satisfactory.

In view of the temptation to remember in such cases, and the ease with which honest witnesses can convince themselves, after many years, of having had a conception of the basis of a valuable patent, oral evidence to prove prior discovery, and thereby overcome the presumption of novelty from the granting of the patent, must be clear and satisfactory.

3. Patents \Rightarrow 174—Improvement patent, substantially advancing art, may be entitled to liberal treatment.

Even though an invention was not a pioneer patent, creating a new art, but was an improvement on an old machine, it is entitled to liberal construction to secure to the inventor the reward he deserves, if it was a very useful discovery which has substantially advanced the art.

4. Patents \Rightarrow 118—Specifications for high and substantial elevation in machine held not too indefinite.

A specification for an improvement in a paper-making machine is not too indefinite, where it stated the improvement to consist in elevating one end of the wire in such machine, without specifying the degree of elevation, except by stating it was high and substantial, where the purpose to be accomplished by the elevation was stated, and a different elevation would be necessary under varying circumstances to accomplish that purpose, especially where the immediate and successful use of the invention showed that the description was sufficient to disclose the improvement.

5. Patents \Rightarrow 52—Effecting result under unusual condition and without intention is not anticipation.

The accidental production of the result attained by the patented improvement under unusual conditions, when the result was not intended and not appreciated, does not constitute anticipation.

Certiorari to the United States Circuit Court of Appeals for the First Circuit.

by the Eibel Process Company against the Minnesota & Ontario Paper Company for infringement of patent. Decree for complainant (267 Fed. 847) was reversed by the Circuit Court of Appeals, with directions to dismiss the bill (274 Fed. 540), and complainant brings certiorari. Decree of Circuit Court of Appeals reversed, and decree of District Court affirmed.

*This was a bill in equity charging the infringement of a patent and seeking an injunction, an accounting and damages. The patent, No. 845,224, issued to William Eibel, February 26, 1907. The application was filed August 22, 1906. The specifications describe the patent as for an improvement for Fourdrinier machines for paper making, and say that "it has for its object to construct and arrange the machine whereby it may be run at a very much higher speed than heretofore and produce a more uniform sheet of paper which is strong, even and well formed." The contention of the plaintiff, the petitioner here, is that his improvement was an important step in the art of paper making, and increased the daily product from 20 to 30 per cent.

The patent was held void by the District Court for the Western District of New York in the Case of Eibel Process Co. v. Remington-Martin Co., 226 Fed. 766 (1914). On appeal, the Circuit Court of Appeals for the Second Circuit reversed the decree of dismissal in the District Court, sustained the patent, and found infringement of claims Nos. 1, 2 and 3, but did not pass upon claims Nos. 7, 8 and 12. 234 Fed. 624, 148 C. C. A. 390 (1916). The bill in the present case was filed in the District Court for Maine, January 1, 1917. That court in 1920 held the patent valid and entered a decree of injunction and for

*47 damages. 267 Fed. 847. On appeal, the Circuit Court of Appeals for the First Circuit reversed the decree and directed the dismissal of the bill. 274 Fed. 540 (1921). Because of the conflict in the two circuits, certiorari was granted to review the latter decree.

The Fourdrinier machine has for many years been well known and most widely used for making news print paper. Its main feature is an endless wire cloth sieve passed over a series of rolls at a constant speed. The sieve known as the "wire" is woven with 60 or 70 meshes to the inch. It may be 70 feet or more in length, and is often more than 100 inches in width. Its working surface, with the total length of 70 feet, is about 30 feet; the rest being taken up in the return of the wire underneath. At what is called the "breast roll," at one end of the machine, there is discharged upon the wire, from a flow box or pond, a constant stream of paper-making stock of fibers of wood pulp mixed with from 135 to 200 times their weight of water of the consistency and fluidity of di-

\Rightarrow For other cases see same topic and KEY-NUMBER in all Key-Numbered Digests and Indexes

luted milk. As this stream moves along the wire, the water drains through its meshes and the fibers are deposited thereon. The process is stimulated by a device to shake the wire with constant and rapid side-wise thrusts, forward and back, which insures the proper interlocking and felting of the stock as it progresses; the water continuing to drain from it. At the end of the surface length of the wire, the stock reaches what are called the "couch rolls," between which it is pressed, and then in the form of a sheet of uniformly distributed pulp, felted sufficiently to hold together, it leaves the wire and is carried through a series of rolls or calendars by which the sheet is pressed and dried, and from which it emerges to be rolled up as finished paper.

In the flow box, or "pond," where the stream of pulp stock is stored, there is a gate or door, forming the end of the flow box, called the "slice," by lifting which the stock

⁴⁸ is given the opportunity to flow upon the wire. The stream thus issuing is given a width of the desired sheet of paper and a depth regulated by the height to which the slice is lifted. The stream on the wire is prevented from flowing off the sides by "deckle straps," which are thick rubber bands, resting on each side of the wire at each side of the pulp. Traveling with the wire, they form lateral walls confining the stock till it is too dry to flow. Between the breast roll, where the stream of liquid stock strikes the wire, and the couch rolls, at the end of the surface length of the wire, there is a series of parallel horizontal rolls supporting the wire, called table rolls, and 20 feet from the breast roll there are placed, under the wire and in contact with it, three suction boxes in succession, in which a partial vacuum is maintained, and through them is sucked out the greater part of the water remaining in the wet sheet of the pulp. Placed above the wire, and just beyond the first suction box, is what is called the "dandy roll," which is faced with wire cloth. Its office is to impress the upper surface of the forming sheet of paper and give it a texture similar to that which the lower surface of the paper has from its contact with the wire. It may also carry the design which is to give the watermark to the sheet, if such a mark is desired. Beyond this is a larger roll, called the "guide roll," arranged with an automatic device varying its axis, so as to keep the wire straight. From the guide roll the wire drops below the plane to the couch rolls, already referred to.

These machines are very large, some of them weighing more than 1,000,000 pounds, and their cost will range as high as \$125,000. They are run night and day, in order that the capital invested in them may yield a proper return. Speed, which increases production, is therefore of the highest im-

portance. Eibel's patent had for its avowed purpose of increase of this speed.

⁴⁹ Eibel says in his specifications:

"My invention is embodied, essentially, in the first part or element of the machine having the Fourdrinier wire or paper-making wire, and consists in causing the stock to travel by gravity in the direction of movement of the making wire and approximately as fast as the making wire moves, thereby resulting in a 'gravity feed' for the machine. The stock may be and preferably is caused to travel more rapidly than the normal or usual speed of the making wire for a certain grade of stock, and means are provided for increasing the speed of the machine, so as to cause the making wire to move at a higher rate of speed than usual, being substantially equal to the speed of the rapidly moving stock. To accomplish this result in a simple manner, the breast roll end of the paper-making wire is maintained at a substantial elevation above the level, thereby providing a continuous downwardly moving paper-making wire, and the declination thus given to the wire is such that the stock is caused to travel by gravity in the direction of the movement of the wire and substantially as fast as the wire moves. The declination of the paper-making wire may be adjustable, or the speed of the wire may be variable, or both the declination and speed of the wire may be adjustable, in order that the velocity produced by gravity in the stock on the declining wire will approximately equal the speed of the wire. By this arrangement the speed of the machine may be increased to such an extent as to bring the speed of the making wire up to the maximum velocity of the rapidly moving stock and a strong, even, and well-formed sheet produced, which is more uniform than usual."

Two figures accompany the specifications of the Eibel patent. Figure No. 1 shows the wire of the Fourdrinier machine in outline, from the breast roll to the guide and couch rolls, with a screw device for raising and

⁵⁰ lowering the breast roll and wire from the horizontal. The outline shows an elevation of the breast roll and wire, so that the angle between the wire and the horizontal at the guide roll is about 4 per cent., which in a surface length of 30 feet would mean an elevation of 12 inches at the breast roll. The other figure, No. 2, shows a device for regulating the speed of the wire applied at the lower couch roll.

Again the patentee says:

"For the purpose of increasing the speed of the machine to the maximum I maintain the breast roll end of the making wire at a high elevation above the level, so that the stock travels by gravity much faster than the making wire ordinarily runs for a certain grade of stock, and I then increase the speed of the machine to such extent as to bring the rate of speed of the making wire up to the speed of the rapidly moving stock, and as a result the capacity of the machine is largely increased.

"I find in practice that by providing a gravity feed operating substantially as herein describ-

ed, the stock runs smoothly and evenly without wavin or rippling, and the fibers are thereby permitted to settle with great uniformity as regards their distribution over the wire, so that the paper in addition to being well formed is very uniform. Furthermore, as the stock is moving with the paper-making wire, instead of being moved by the wire, or essentially by the wire, the formation of the paper will begin at the start, and will continue to the end of the travel of the stock with the wire."

The claims in question are:

1. A Fourdrinier machine, having the breast roll end of the paper-making wire maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly in the direction of movement of the wire, and at a speed approximately equal to the speed of the wire, substantially as described.

2. A Fourdrinier machine having the breast roll end of the paper-making wire maintained

at a high elevation, *whereby the stock is caused to travel by gravity faster than the normal speed of the wire for a certain grade of stock, and having means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly-moving stock, substantially as described.

3. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, the breast roll end of the wire being maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire and at a speed approximately equal to the speed of the wire, substantially as described.

7. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, and the suction boxes supported at a corresponding declination, substantially as described.

8. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, and the several suction boxes arranged at different elevations, substantially as described.

12. In a Fourdrinier machine, a downwardly moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire, caused by gravity, is so related to the velocity of the wire in the same direction, that waves and ripples on the stock are substantially avoided and the fibers deposited with substantial uniformity on the wire, substantially as described.

Messrs. Frederick P. Fish and Harrison F. Lyman, both of Boston, Mass., for petitioner.

Mr. Amasa C. Paul, of Minneapolis, Minn., for respondent.

*Mr. Chief Justice TAFT, after stating the case as above, delivered the opinion of the Court.

The evidence in the case establishes that, before Eibel entered the field, continued high speeds in the wire of the Fourdrinier machine much beyond 500 feet a minute resulted in defective paper. Eibel concluded that

this was due to the disturbance and ripples in the stock as it was forming at a point between the breast roll and the first suction box, caused by the fact that at that point the wire was traveling much faster than the stock, and that if at that point the speed of the flowing stock could be increased approximately to the speed of the wire, the disturbance and rippling in the stock would cease, and the defects would disappear from the paper product. Accordingly he proposed to add to the former speed of the stock by substantially tilting up the wire and giving the stock the added force of the down hill flow. He thought that as long as he could thus maintain equality of speed between stock and wire at the crucial point, and prevent the disturbance and rippling there, a further increase in the speed of the wire would not result in a defective product. He confirmed this by actual trial.

The first and most important question is whether this was a real discovery of merit. The Circuit Court of Appeals thought not. The prior art and the obvious application of the principle that water will run down hill in their opinion robbed it of novelty or discovery. The issue is one largely of evidence.

[1] The plaintiff below introduced the patent and some evidence of infringement, and a single expert to explain the discovery and invention, and rested. Then the defendant brought in a mass of evidence to show prior discovery and use, to impeach the utility of plaintiff's alleged invention, and to demonstrate the indefiniteness of specification and claims. The fact that the adjudication of

the *validity of the patent would impose a royalty on many of the paper manufacturers of the country who were not already licensees of the plaintiff led to the defendant's sending a circular letter to awaken the interest and secure the help of all so situated. This, as the record shows, had the effect to invoke offers of testimony on the critical points in the case from the unlicensed part of the trade. The plaintiff introduced a few witnesses in rebuttal as to particular details and the same expert as in chief. The plaintiff's case as presented on the record is largely the presumption of validity and novelty attaching to the patent and such evidence as comes from defendants' witnesses. A case that can be made out in all its elements by cross-examination of opposing witnesses is a strong case. Implication of facts and conditions falling from the mouths of witnesses when only collateral to the exact point of inquiry for which they are called is generally the most trustworthy evidence because the result of the natural, so to say, subconscious adherence to truth uninfluenced by a knowledge or perception of the bearing of the implication on the ultimate issue in the case.

A thorough examination of the whole voluminous record produces a satisfying conviction

tion first that for years news print paper makers and manufacturers of paper-making machinery were engaged in seeking a method of increasing the speed of the news print machines, and that they had succeeded by improving the stock and by strengthening the parts in bringing the speed of the wire and the delivered paper up to between 500 and 600 feet a minute, but that when these high speeds were attained and maintained for any length of time, though they served to enable manufacturers to advertise such maximums, their continued and regular operation showed defects in the paper, which were only overcome by a reduction of speed to something less than 500 feet. As against

⁵⁴ advertisement, and the exuberant *memory of witnesses, the actual contemporaneous record of daily figures of production whenever brought to light justifies this conclusion. A leading manufacturer, one of the most enthusiastic witnesses on the subject of speed before Eibel produced a memorandum of a visit he made in October, 1904, less than two years before Eibel's application, to see the operation of a machine he had manufactured which he called "the banner installation of the world" and made an entry in his diary, "Grand sight—475 feet." There is the usual unconscious straining of memory without written record carried back 10 or 15 years, but the evidence on the whole is satisfying that the practical speed for the regular production of good news print paper never much exceeded that speed which had gratified the pride of this witness. A typical case is in that of machines made by Bagley & Sewall, large manufacturers of paper-making machines for the Laurentide Paper Company. The president of Bagley & Sewall testified that the speed of the machine was 552 feet a minute with satisfactory paper, and that he visited Laurentide in October, 1904, and counted the revolutions himself. He produced a letter from Mr. Chahoon, of the Laurentide Company, of about the same date confirming his statement of the count and the satisfactory product and an advertisement of Bagley & Sewall to the same effect of January, 1905. In rebuttal, a monthly record of the work of the machine is produced by the foreman at Laurentide for this same machine from January, 1905 to December, 1906, showing the speed to vary from a maximum of 518 in 1905, to 475 in 1908, with a general average of less than 500, and an explanation that the high speeds did not make a good product and were reduced. Our conclusion is confirmed, and indeed the importance of the issue of fact as to maximum speed before Eibel is minimized by the circumstance, uncontroverted, that the owners of these fastest machines, at once upon Eibel's publi-

⁵⁵ cation of his discovery, adopted his pitch and increased their product.

What Eibel tried to do was to enable the paper maker to go to 600 or 700 feet and above in speed and retain a good product. Did he do it? Eibel was the superintendent of a paper mill at Rhinelander, Wis. Before August, 1906, he raised the pitch of the wire from 2 or 3 inches to 12 inches, and greatly increased the speed, with a satisfactory product, and in that month he applied for a patent. The defendant's witnesses without exception refer to that disclosure as something that surprised and startled the paper-making trade. It spread, to use the expression of one witness, like wildfire. There were those who hesitated to take the venturesome step to give such an unheard-of pitch to the wire, and waited until others assumed the risk, but the evidence is overwhelming that within a short interval of a year or two all of the fast machines were run with wires at a pitch of 12 inches and that this pitch has been increased to 15 and 18, and even 24, inches; that the speed of the machines with satisfactory product has increased to 600, 650, and even 700 feet, with plans now even for 1,000 feet and that the makers of two-thirds of the print paper of the country are licensees of Eibel.

Defendant attempts to break the effect of this evidence by showing that five of the largest paper manufacturers who are licensees of Eibel are also shareholders in the Eibel Process Company, the plaintiff, and that they make 2,200 tons of the 5,000 tons of paper made daily in the United States. This circumstance seems to have had influence with the Circuit Court of Appeals. There are, however, 10 other paper-making companies, not shareholders, who are licensees and use the Eibel pitch, and whose aggregate production is 1,200 tons a day; and what is equally significant, 13 other compa-

⁵⁶ nies have contributed to a fund to help in resisting the establishment of the right of Eibel to claim a royalty for the use of this high or substantial pitch of the wire in the making of paper. Presumably they, too, find it wise to use the Eibel pitch. The paper makers in this country, who do not use the Eibel pitch, therefore, are few. It can hardly be that dividends on the shares of stock in the Eibel Company held by the five large companies would furnish motive enough for them to continue to be licensees, and to use something that was not of great advantage to them in their chief business of making of paper, and certainly no such motive would explain the action of the licensees, who are not stockholders, or that of the infringers, in continuing to use the Eibel pitch. It should be said that one of the large manufacturers of paper-making machinery called by the defendant said that since 1907 he had not installed a single machine without the Eibel pitch.

The fact that the Eibel pitch has thus been generally adopted in the paper-making business, and that the daily product in paper making has thus been increased at least 20 per cent. over that which had been achieved before Eibel, is very weighty evidence to sustain the presumption from his patent that what he discovered and invented was new and useful. Of course, although very persuasive, it is not conclusive, and may be explained. This brings us to the consideration of the evidence of the prior art, and the contention of the defendant and the conclusion of the court below, that the step taken by Eibel, so far as he took one, was a mere obvious application of fully developed devices in the prior art.

Eibel in his patent gives this measure of the prior art:

"The Fourdrinier wire has usually been arranged to move in a horizontal plane, although I am aware that means have been provided for adjusting the breast roll and of the wire to different elevations usually below the level, to provide for running with different grades of

*stock—as, for instance, with quick stock and slow stock; but so far as I am aware the making wire has always had to perform the work of drawing along the stock, and as the wire moved much faster than the stock the stock waved or rippled badly near the breast roll end of the wire, which gradually diminished until an equilibrium was established, and a smooth, even, glassy surface presented, and not until the waving or rippling ceased did the fibers lay down uniformly and produce a well-formed sheet of paper. The machine has been run necessarily at a slow rate of speed to give ample time for the water to escape and for the fibers to lay down, so as to make a uniform sheet, and in case the time was insufficient, the breast roll end of the wire has been lowered still further until the desired result was accomplished. In accordance with my invention I operate entirely above the level, to cause the stock to travel by gravity at a velocity approximately equal to the speed of the making wire, which I believe to be a new principle of operation."

—It is important that the stock, when it reaches the "dandy" roll beyond the first suction box of the machine, shall be, on the one hand, free enough of water to be a formed sheet and take an impression from the dandy roll, and on the other that it shall not be so dry that it will not retain the impression. Paper of such a heavy composition of fiber and water that it holds water long is said to be "slow stock." Paper of lighter and thinner composition, parting with water easily and drying quickly, is called "quick stock." Various means were adopted to give the stock the proper degree of dryness at the dandy roll, usually by adjustment of the composition of the stock. What Eibel describes in this reference was another means. It was not widely used, however. It was a slight depression or elevation in the wire at the breast roll, so that slow stock could be made

to run up hill from the flow box to the dandy roll, lengthening the time of *the movement, and thus giving more opportunity in its progress for the needed draining of the stock. On the other hand, fast or thin stock, from which the water flowed too easily, could be made to retain sufficient water by hastening its progress to the dandy roll by the downhill tilt of the wire. This tilt was obtained by raising the breast roll end of the wire, either by putting shimming blocks under that end of the machine or by special devices to be described. The sole object was greater or less drainage of stock for the dandy roll. The Eibel invention is distinguished from the prior art in two ways: First, in that the pitch of the wire was for a different purpose, to be accomplished, not at the dandy roll, but at a point only 9 or 10 feet from there; and, second, by the fact that to achieve his purpose a high or substantial pitch must be given to the wire, while only a small or trivial pitch was needed for the drainage of the prior art.¹

This difference in purpose and degree of pitch between Eibel's device and the prior art is quite clearly shown by reference to a patent granted to Barrett and Horne, assignors to J. H. Horne & Sons, one of the important manufacturers of paper machinery of the country, in 1899. Their specifications showed a device capable of elevating the breast roll less than 3 inches, and its sole purpose was for drainage. Their specifications say:

"In certain kinds of pulp, notably the wood pulp which is now largely used in making paper, the water drains away very rapidly, so that the pulp may become nearly dry before it leaves the shake frame, and thus not be properly laid when it reaches the rollers. This tendency may be obviated to a considerable extent by downwardly inclining the shake frame toward the rollers, so that the water tends to travel along with the pulp, and will not, therefore, drain out through the wire so rapidly. It is further desirable that the amount of inclination or slope should be variable, so as to adapt the machine for pulp of different kinds or grades."

The Bayliss Austin machine, one of three chiefly relied on to show prior use, was made by the Horne Company and was designed by Barrett and Horne on the model of this pat-

¹ It is true that defendant's expert, Carter, points out that in some of the machines of the prior art, in which means were provided for tilting up the wire, the tilting was confined to that part of the surface length covered by the shake frame, say 18 feet, and did not extend to the first suction box; whereas, Eibel's tilting involved the entire surface length of 30 feet. It would follow from this that the elevation of 3 inches in such machines would mean a greater angle of declination than 3 inches for the full surface length and that the disparity between 3 inches and 12 inches was not so great as the figures would lead one to think. But, whatever difference this might make, the fact remains that Eibel's pitch was substantially greater than anything in the prior art.

ent. It is very clear, from an examination of the design and contract for this machine, that the pitch of the wire in it could not have exceeded 3 inches, and that it was used for drainage. Other patents were set up in defense; some of them showing devices for raising the breast roll and wire above the level, and lowering them below the level for the purpose of drainage. The angle of elevation and depression was always small. There was a constant straining by the witnesses for the defense to increase the elevation before Eibel. On the direct examination they began with a positive assertion that a pitch of 4, 5, and even 6 inches, had been used in certain machines before Eibel's time; but written records, contracts, and specifications brought out on cross-examination show nothing more than 3 inches provided for purpose of drainage, and not more than that was used. This is not to say that witnesses in the face of such records did not testify to a higher elevation; but in such cases the amount of elevation rested in memory running back more than 10 or 15 years, a memory stimulated by the subsequent high pitches of Eibel and the retrospect of the

*60

*progress that now seems so easy and clear to every one. There was, too, always indefiniteness as to when such increase in elevation of the wire had taken place, whether before or after August, 1906, Eibel's date, and there was no evidence of weight, we think, after a full examination of the record, sufficient to justify a finding that such elevations had ever exceeded 3 inches before his application.

[2] This is confirmed by the fact that greater elevation was not needed for the purpose of drainage for which it was devised and used. It is true that some witnesses testify that they realized, before Eibel's application, that speeding up the stock to equal velocity with the wire would solve the difficulty and aid the speed. But there is not a single written record, letter, or specification of prior date to Eibel's application that discloses any such discovery by any one, or the use of the pitch of the wire to aid the speed of the machine. The oral evidence on this point falls far short of being enough to overcome the presumption of novelty from the granting of the patent. The temptation to remember in such cases and the ease with which honest witnesses can convince themselves after many years of having had a conception at the basis of a valuable patent, are well known in this branch of law, and have properly led to a rule that evidence to prove prior discovery must be clear and satisfactory. *Barbed Wire Patent Case*, 143 U. S. 275, 284, 12 Sup. Ct. 443, 36 L. Ed. 154; *Loom Co. v. Higgins*, 105 U. S. 580, 591, 26 L. Ed. 1177. Indeed, when we consider the indisputable fact that Eibel's successful experiment at Rhinelander and his application

for a patent surprised the whole paper trade, and that for a short time many held back from risking so radical a change and then all adopted it, oral evidence that some persons had discovered the source of trouble and the means of remedying it some years before Eibel is incredible. We are confirmed in this conclusion by the finding of Judge

Hale in the District Court, which is not offset by the reversal of his decree in the Circuit Court of Appeals, because that court seems to have reached its conclusion chiefly on other grounds yet to be considered.

The defendant's counsel contend that the specifications of the Eibel patent require that the only force to be used in giving speed to the stock shall be the force of gravity created by the angle of down-hill inclination of the wire. They say that the patentee mentions no other means of acceleration, that he must be confined to this, and that a machine which uses other factors for this purpose does not infringe. We do not understand the Circuit Court of Appeals to go quite so far, but it does seem to give a construction requiring the force of gravity caused by the pitch of the wire to be the predominating cause of the increased speed of the stock. The factors of speed of the stock in such a machine, before the factor of pitch was applied to increase it, were the head or hydraulic pressure of the stock in the flow box behind the slice, imparting movement to it as it came out onto the wire under the lifted slice, and the carrying effect of the moving wire upon the fluid stock as it fell upon the wire and proceeded gradually to form into a web as the fibers were laid and the water drained.

Many calculations were made by defendant's expert Carter, based on the laws of hydraulic pressure and flow, to show that, under varying conditions of head and pitch and the speed of the wire, the chief factor would be head, the next the "drag" or carrying effect of the wire, and the least in degree and importance in making the velocity of the stock and the wire equal would be the pitch, and that Eibel's invention could not be present, because the "drag" of the wire and its influence upon the speed of the stock must be eliminated under Eibel's specifications. We do not so understand it. As the stock descends upon the wire with the head of the flow box, it is thin and liquid, the wire at its greater speed necessarily

*62

imparts additional speed to the stock, and in its unformed fluidity the added speed does not disturb or ripple the stock to the injury of the process of paper making. It is only after the stock proceeds a third or a half of the surface length of the wire that the point is reached where the overspeed of the drag becomes troublesome in the felting or formation of the web of the pulp. Before that point is reached, the "drag" may be useful

In bringing the speed of the stock nearer to that of the wire without injury. The truth seems to be, and this is brought out with force in the testimony of the defendant's expert witness Livermore, that while it is possible to calculate to a nicety the velocity of the free flowing liquid stock due to head and pitch, when unaffected by drainage, variation in viscosity and fluidity, and the like, yet, when these conditions are present, as they always are, and the other less calculable factor of the drag of the wire enters the problem, there is no means, short of actual experiment, to enable one to anticipate results, and it is quite impossible to apportion to each factor its real influence. This fact reflects on the question whether Eibel's discovery was invention rather than the mere obvious and simple application of known natural forces.

The defendant introduced expert evidence to show that with a head of $2\frac{1}{4}$ inches in the flow box and a speed of 585 feet to the minute in the wire, and excluding the factor of "drag" of the wire, it would require an elevation of 48 inches to make up the difference in speed of the stock given by the head and the speed of the wire at a distance 10 feet from the point of discharge on the wire. The conclusion drawn from this seems to be that, as no practical machine uses 48 inches pitch, the Eibel invention has never been used or infringed. Disregarding its error in omitting necessary factors already adverted to, this reasoning seems to us to depend on too narrow a construction of the patent.

^{*63}
[3] *In administering the patent law, the court first looks into the art, to find what the real merit of the alleged discovery or invention is, and whether it has advanced the art substantially. If it has done so, then the court is liberal in its construction of the patent, to secure to the inventor the reward he deserves. If what he has done works only a slight step forward, and that which he says is a discovery is on the border line between mere mechanical change and real invention, then his patent, if sustained, will be given a narrow scope, and infringement will be found only in approximate copies of the new device. It is this differing attitude of the courts toward genuine discoveries and slight improvements that reconciles the sometimes apparently conflicting instances of construing specifications and the finding of equivalents in alleged infringements. In the case before us, for the reasons we have already reviewed, we think that Eibel made a very useful discovery, which has substantially advanced the art. His was not a pioneer patent, creating a new art; but a patent which is only an improvement on an old machine may be very meritorious, and entitled to liberal treatment. Indeed, when one notes the

crude working of machines of famous pioneer inventions and discoveries, and compares them with the modern machines and processes exemplifying the principle of the pioneer discovery, one hesitates in the division of credit between the original inventor and the improvers, and certainly finds no reason to withhold from the really meritorious improver, the application of the rule "*ut res magis valeat quam pereat*," which has been sustained in so many cases in this court. *Winans v. Denmead*, 15 How. 338, 341, 14 L. Ed. 717; *Corning v. Burden*, 15 How. 265, 269, 14 L. Ed. 683; *Turrill v. Railroad Co.*, 1 Wall. 491, 510, 17 L. Ed. 668; *Rubber Co. v. Goodyear*, 9 Wall. 753, 795, 19 L. Ed. 566; *McClain v. Ortmyer*, 141 U. S. 419, 425, 12 Sup. Ct. 76, 35 L. Ed. 800.

Eibel was an avowed improver, not in the art of paper making generally, but upon

^{*64}
a well-known and universally *used machine. In that machine, the speed of the stock, which was the subject-matter of his improvement, had always been controlled by two factors, the head of the stock in the flow box, and the carrying effect of the under-moving wire. He says nothing in his specifications to exclude these factors; he merely adds another factor of speed to secure the equality of speed of the stock with the wire. He says:

"For the purpose of increasing the speed of the machine to the maximum I maintain the breast roll end of the making wire at a high elevation above the level, so that the stock travels by gravity much faster than the making wire ordinarily runs for a certain grade of stock, and I then increase the speed of the machine to such an extent as to bring the rate of the making wire up to the speed of the rapidly moving stock, and as a result the capacity of the machine is largely increased."

We agree fully with Judge Hale in the District Court in his comment on this:

"The process invented by him [Eibel] begins to operate after the stock has entered upon the wire. His apparent attempt was to get rid of bubbles and wrinkles, before he got to the place on the machine where the paper is formed. To do this, he allowed gravity to work with 'drag' and with 'head.' He harnessed all the elements he could find. He brought gravity in with the other elements, and so brought the speed of the stock up to equality with that of the wire. By this means he achieved high speed and also freed the stock on the wire from waves and ripples." 267 Fed. 855.

The Circuit Court of Appeals questions the assumption that gravity was a new factor with Eibel, because the head of the flow box is only another application of the force of gravity. This is a mere criticism of a term, which, whether accurate or not, is not misleading. What Eibel was dealing with in his patent as a new factor was the addi-

*65
tional "force acquired by the pitch of the wire, and that he called gravity; and Judge Hale, in the passage quoted, uses the word with the same meaning, and without any confusion to the reader.

We think, then, that the Eibel patent is to be construed to cover a Fourdrinier machine in which the pitch of the wire is used as an appreciable factor, in addition to the factors of speed theretofore known in the machine, in bringing about an approximation to the equal velocity of the stock and the wire at the point where, but for such approximation, the injurious disturbance and ripples of the stock would be produced.

[4] The next objection to the patent, which prevailed in the Circuit Court of Appeals, is that its terms are too vague, because the extent of the factor of pitch is not defined, except by the terms "substantial" and "high." The figure accompanying the specification and illustrating the improvement indicates an angle of 4 per cent., or an elevation of 12 inches, and the reference to the small elevations for drainage shown in earlier devices indicated that the patentee had in mind elevations substantial as compared with them, in order to achieve his purpose of substantially increasing the speed of the stock. It was difficult for him to be more definite, due to the varying conditions of speed and stock existing in the operations of Fourdrinier machines and the necessary variation in the pitch to be used to accomplish the purpose of his invention. Indefiniteness is objectionable, because the patent does not disclose to the public how the discovery, if there is one, can be made useful, and how its infringement may be avoided. We do not think any such consequences are involved here. This patent and its specifications were manifested to readers who were skilled in the art of paper making and versed in the use of the Fourdrinier machine. The evidence discloses that one, so skilled, had

*66

no difficulty, when his attention was called to their importance, in fixing the place of the disturbance and ripples to be removed, or in determining what was the substantial pitch needed to equalize the speeds of the stock and wire at that place. The immediate and successful use of the pitch for this purpose by the owners of the then fastest machines and by the whole trade is convincing proof that one versed in paper making could find in Eibel's specifications all he needed to know, to avail himself of the invention. Expressions quite as indefinite as "high" and "substantial," in describing an invention or discovery, in patent specifications and claims, have been recognized by this court as sufficient. In *Tilghman v. Proctor*, 102 U. S. 707, 26 L. Ed. 279, the claim sustained was for "the manufacturing

of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure." See, also, *Rubber Co. v. Goodyear*, 9 Wall. 788, 794, 19 L. Ed. 566; *Mowry v. Whitney*, 14 Wall. 620, 629, 20 L. Ed. 860; *Lawther v. Hamilton*, 124 U. S. 1, 9, 8 Sup. Ct. 342, 31 L. Ed. 325; *Carnegie Steel Co. v. Cambria Iron Co.*, 185 U. S. 403, 436, 22 Sup. Ct. 698, 46 L. Ed. 968; *Abercrombie & Fitch Co. v. Baldwin*, 245 U. S. 198, 205, 38 Sup. Ct. 104, 62 L. Ed. 240.

[5] It is contended on behalf of the defendant that, whether Barrett and Horne perceived the advantage of speeding up the stock to an equality with the wire, yet the necessary effect of their devices was to achieve that result, and therefore their machine anticipated Eibel. In the first place, we find no evidence that any pitch of the wire, used before Eibel, had brought about such a result as that sought by him, and, in the second place, if it had done so under unusual conditions, accidental results, not intended and not appreciated, do not constitute anticipation. *Tilghman v. Proctor*, 102 U. S. 707, 711, 26 L. Ed. 279; *Pittsburgh Reduction Co. v. Cowles Electric Co.* (C. C.) 55 Fed. 301, 307; *Andrews v. Carman*, 13 Blatchford, 307, 323, Fed. Cas. No. 371.

It is next objected that the alleged invention covers only a matter of degree in pitch, which cannot be the subject of a patent. The

*67

prior art showed the application of gravity by use of the pitch of the wire to the improvement of the Fourdrinier machine, and Eibel, it is said, merely increased degree of pitch and gravity for the same general purpose. We think this attack upon the patent cannot prevail. Eibel's high or substantial pitch was directed toward a wholly different object from that of the prior art. He was seeking thereby to remove the disturbance and ripples in the formation of the stock about 10 feet from the discharge, while the slight pitches of the prior art were planned to overcome the dryness in the formed web of the stock at double the distance from the discharge. It would seem that the greater speed of the stock produced by Eibel would make difficult the joint application of the principles of Eibel and Barrett and Horne, and that the function of adjusting the drainage for the dandy roll must be carried on by some of the other methods known to the art when Eibel's pitch is used. But, however this may be, the object of the one was entirely different from that of the other. Livermore, an expert witness called by the defendant, when asked the question whether the purpose of the Barrett and Horne patent had anything in common with the theory of the Eibel patent answered:

"I should say not. It looks to me as if Barrett and Horne referred to the adjustment of inclination with one effect in mind, and that Eibel referred to like adjustment with another

effect in mind. * * * In this particular case, the two effects have, so far as I can see, no special correlation to one another, and an adjustment made with one effect in mind might or might not produce a desirable effect as to the other function or phenomenon."

In considering this phase of the controversy, we must not lose sight of the fact that one essential part of Eibel's discovery was that the trouble causing the defective paper product under high machine speed was in the disturbance and ripples some 10 feet from

the discharge, and that *they were due to the unequal speeds of stock and wire at that point and could be removed by equalizing the speeds. The invention was not the mere use of a high or substantial pitch to remedy a known source of trouble. It was the discovery of the source not before known, and the application of the remedy, for which Eibel was entitled to be rewarded in his patent. Had the trouble which Eibel sought to remedy been the well-known difficulty of too great wetness or dryness of the web at the dandy roll, and had he found that a higher rather than a lower pitch would do that work better, a patent for this improvement might well have been attacked on the ground that he was seeking monopoly for a mere matter of degree. But that is not this case. On the other hand, if all knew that the source of the trouble Eibel was seeking to remedy was where he found it to be, and also knew that increased speed of the stock would remedy it, doubtless it would not have been invention on his part to use the pitch of the wire to increase the speed of the stock, when such pitch had been used before to do the same thing, although for a different purpose and in less degree. We cannot agree with the Circuit Court of Appeals that the causal connection between the unequal speeds of the stock and the wire, and the disturbance and rippling of the stock, and between the latter and the defective quality of the paper in high speeds of the machine, was so obvious that perception of it did not involve discovery which will support a patent. The fact that in a decade of an eager quest for higher speeds this important chain of circumstances had escaped observation, the fact that no one had applied a remedy for the consequent trouble until Eibel, and the final fact that, when he made known his discovery, all adopted his remedy, leave no doubt in our minds that what he saw and did was not obvious, and did involve discovery and invention.

The Circuit Court of Appeals dwells on the fact that the use of the pitch of the wire was not really the intro*duction of a new factor in the solution of the problem, because the same result would have followed

if the head of the flow box had been made greater, in order to increase by gravity the speed of the stock. Doubtless this could have been done. There were difficulties, however, in such a method, when Eibel's application was filed, because in the then machines the flow box was supported by an apron over the wire, and the necessary addition to the weight of the stock in the flow box, in increasing the head, would have interfered with the free working of the wire. Since that time an improvement has been adopted, by which the flow box does not rest on the wire, and additional head can be imparted to the stock. The defendant invites attention to the fact that one or two paper makers are increasing this head and giving up the pitch, for the purpose of increasing the speed of the stock. We do not see that these circumstances in any way affect the validity of the Eibel patent. If defendant or others can do what Eibel accomplished in another way, and by means he did not include in his specifications and claims, i. e., by additional head and the abandonment of a substantial pitch, they are at liberty to do so and avoid infringement.

We come finally to the question of infringement. If the Eibel patent is to be construed as we have construed it, there can be no doubt that the defendant uses the Eibel invention. The device which the defendant uses for tilting the wire—i. e., by shimming blocks—and that for regulating and increasing the speed of the wire are plainly equivalents of the same elements in the new combination, which Eibel shows in his drawings and specifications. The defendant uses a Fourdrinier machine having the breast roll end of the paper-making wire maintained at an elevation of 15 inches above the level whereby the stock is caused to travel by gravity rapidly in the direction of the movement of the wire, and at a speed

approximately *equal to the speed of the wire substantially as described. This brings the defendant's machines within the first claim of the patent, if 15 inches is a substantial elevation of the making wire, as all the witnesses concede that it is. The same conclusion must be reached as to the second claim, because the defendant uses a machine "having the breast roll end of the paper making wire maintained at a high elevation, whereby the stock is caused to travel by gravity faster than the normal speed of the wire for a certain grade of stock, and having means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly moving stock, substantially as described." The same thing is true of the third claim.

Question has been made whether these three claims are for a machine or a process.

We think they are claims for a machine, i. e., for an improvement on a machine, and that the devices for such improvement, to wit, the elevation by a screw or other equivalent method, and the control of the speed of the wire, are shown by the specifications and the figures, together with a sufficient description of their operation.

The seventh and eighth claims are for the same improvement, with the suction boxes changed from their usual position in the unimproved machine, to make them effectively function on the pitched wire. They are machine claims, and are infringed by the defendant. Their new adjustment is part of a new combination, and the words "substantially as described" limit them to a combination including the elements included in the first three claims.

Claim No. 12 is as follows:

"12. In a Fourdrinier machine, a downwardly moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire,

^{*71} caused by gravity, is so related to the *velocity of the wire in the same direction that waves and ripples on the stock are substantially avoided and the fibers deposited with substantial uniformity on the wire, substantially as described."

This comes nearer to being a process claim, but, whether it is or not, the defendant infringes it.

The evidence discloses that, after the suit was brought, the defendant reduced the pitch of one of its machines to 6 inches, and the contention of defendant is that the machine ran as well and gave as good results as when its pitch was 15 inches. We are not called upon to decide whether this contention can be sustained, because the reduction was after the bill was filed. It may be noted, however, that the admissions of witnesses seem to show that this reduction was made for purposes of the suit, and that, immediately after the defendant won the suit in the Circuit Court of Appeals, it restored the pitch of this machine to 15 inches, and, when the decree of the Circuit Court of Appeals proved not to be final, the wire was lowered again to a 6-inch pitch. Much evidence was taken, and much discussion has followed; upon the point whether a 6-inch pitch, accomplishing in whole or in part what Eibel sought to do, would infringe a patent for a substantial pitch. We do not find it necessary to pass definitely on the question, because it is not before us on the record, though we cannot prevent the natural inferences upon this point to be drawn from the conclusions we have reached.

The decree of the Circuit Court of Appeals, dismissing the bill, is reversed, and the decree of the District Court is affirmed.

VANDENBURGH v. TRUSCON STEEL CO.

(Argued Jan. 17, 1923. Decided Feb. 19, 1923.)

No. 273.

1. Patents $\text{E} \Rightarrow 328$ —Reissue, 14,182, claims 1 and 2, for reinforcing bar for concrete, held void.

The Vandenburg reissue patent, No. 14,182, claims 1 and 2, which were issued nine years after the original patent, and which substituted for the word "rigidly," as used in the original claims, the word "permanently," held void as an afterthought, to make the patent applicable to devices made by others subsequent to the original patent.

2. Patents $\text{E} \Rightarrow 328$ —Reissue, 14,182, claims 3 and 5, for reinforcing bar for concrete, held not infringed and void.

The Vandenburg reissue patent, No. 14,182, claims 3 and 5, for reinforcing bar for concrete, held not infringed by defendant's structure, and void for want of invention.

3. Patents $\text{E} \Rightarrow 27(1)$ —Introduction into concrete reinforcing art of elements known in metal art is not invention.

It was not invention to introduce into the concrete reinforcing art the kerf and spur as a means of attaching the spiral coils to the reinforcing bar, which elements were old in the metal arts, where they had been used for a similar purpose.

Certiorari to the Circuit Court of Appeals for the Sixth Circuit.

Suit by George E. Vandenburg against the Truscon Steel Company for infringement of patent. A decree dismissing the bill was affirmed by the Circuit Court of Appeals (277 Fed. 345), and complainant brings certiorari. Affirmed.

^{*7} *This was a bill in equity by Vandenburg, praying an injunction and accounting for the infringement of a patent granted him January 22, 1907, No. 841,741, and reissued to him August 15, 1916, reissue No. 14,182. The patent is for a reinforcing bar to be used in concrete construction.

The patent, since reissue, has been the subject of litigation in the Second, Third, and Sixth circuits. In all the circuits, the first and second claims of the reissue have been held void, because too broad, and because secured nine years after the original issue, for the purpose of covering intervening devices. In the Second circuit, Judge Hough, sitting on the District Court, found that claim 3 must be so narrowly construed that defendant's device did not infringe. The Circuit Court of Appeals sustained the third claim and found infringement, reversing the District Court's decree, and sent the case back for assessment of profits, which have been found to be about

make a finding of culpable conduct on the part of the losing party, such as bad faith, fraud, malice or knowing infringement before a case qualifies as 'exceptional.' " *Ferrero U.S.A., Inc. v. Ozak Trading, Inc.*, 952 F.2d 44, 47 [21 USPQ2d 1215] (3d Cir. 1991). The district court found that Zuccarini acted willfully and in bad faith when he registered the "Joe Cartoon" domain names in an effort to confuse people and to divert Internet traffic to his web sites for his own economic gain. The court found that Zuccarini conducted no bona fide business related to Joe Cartoon and that he had no basis on which to believe his use of the domain names was fair and lawful.

[8] Although the term "bad faith" is written into § 1125(d)(1)(A)(i) such that it is a threshold finding for any violation of the ACPA, we are persuaded that the district court made a proper finding that, under the circumstances, this case qualified as "exceptional" and merited the award of attorneys' fees under § 1117(a).⁶ The record indicates that Zuccarini's conduct was particularly flagrant⁷ and that he showed no remorse for his actions. The court stated that "based on the egregiousness of Zuccarini's conduct and his lack of contrition, we without hesitation hold that this is an 'exceptional' case and that Shields was entitled to an award of attorneys' fees." App. at A25. The court's interpretation of what constitutes an "exceptional" case under the ACPA is proper.

We have considered all contentions presented by the parties and conclude that no further discussion is necessary.

The judgment and the award of statutory damages and attorneys' fees will be affirmed.

⁶ In determining that this case is "exceptional" under § 1117(a), we do so without deciding whether the finding of "bad faith" under § 1125(d)(1)(A)(i) automatically warrants an award of attorneys' fees under § 1117(a) and the case law that has interpreted that provision. See *Ferrero U.S.A., Inc.*, 952 F.2d at 47.

⁷ Between the issuance of the March 22, 2000 preliminary injunction, through the date of the determination that he violated the ACPA, and up until the date of the hearing to determine statutory damages and attorneys' fees and costs, Zuccarini registered an additional 1,644 domain names that were common misspellings of other famous companies' and/or celebrities' names.

Rapoport v. Dement

U.S. Court of Appeals
Federal Circuit

No. 00-1451

Decided June 28, 2001

PATENTS

[1] Patent construction — Claims — Broad or narrow (§ 125.1303)

Patent construction — Claims — Defining terms (§ 125.1305)

Term "treatment of sleep apneas," as used in interference count claiming method of treatment, is properly construed as referring only to reduction of frequency and severity of apnea episodes during sleep, rather than to "treatment of symptoms associated with sleep apneas" such as anxiety and depression, since ordinary meaning of term narrowly refers to treatment of underlying disorder itself, since written description defines "sleep apneas" in terms of underlying disorder, since summary of invention in senior party's application states that treatment is administered "at the hour of sleep," indicating that it is used to treat symptoms occurring during sleep, and since senior party's description of efficacy of claimed treatment method only addresses its effect on underlying disorder.

[2] Patentability/Validity — Anticipation — Identity of elements (§ 115.0704)

Patentability/Validity — Anticipation — Prior publication (§ 115.0705)

Substantial evidence supports finding by Board of Patent Appeals and Interferences that claims in senior party's application, corresponding to interference count claiming "method for treatment of sleep apneas" by administration of azapirone, were not anticipated by prior art reference, since term "treatment of sleep apneas" is properly construed as referring only to treatment of underlying respiratory disorder and not to ancillary symptom of anxiety, since publication discloses treatment of anxiety caused by sleep apnea using azapirone compound buspirone, but does not disclose treatment of sleep apnea disorder itself, since publication does not contain information regarding buspirone's effect on upper airway during sleep, or specify administration

of treatment at bedtime, since there is nothing to indicate that doses of buspirone given as directed in publication would necessarily be "therapeutically effective amount" for treatment of underlying disorder as required by count, and since senior party's invention therefore is not inherent in publication's disclosure.

[3] Practice and procedure in Patent and Trademark Office — Interference — Pleadings and submissions (§ 110.1706)

Practice and procedure in Patent and Trademark Office — Interference — Motions (§ 110.1717)

Junior party's motion for acceptance of belated filing, in which junior party alleged that prior invention of claims by different inventive entity either anticipated or rendered obvious senior party's claims, was properly denied, since notice of interference should have made junior party aware that senior party had priority benefit of abandoned application, since senior party's notification should have made junior party aware that senior party was obligated to assign interests to other entities, and since junior party did not show sufficient cause why his motion was not filed sooner.

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent interference proceeding (no. 102,760) between David M. Rapoport, junior party, and William C. Dement, Mark R. Rosekind, and Jeffrey L. Schwimmer, senior party. Junior party appeals from board's finding that senior party's claims corresponding to count were not anticipated nor rendered obvious by prior art, and from denial of motion to accept belated finding and dismissal of belated motion for judgment. Affirmed.

Roger L. Browdy, of Browdy and Neimark, Washington, D.C., for appellant.

David S. Abrams and Robert H. Berdo, of Roylance, Abrams, Berdo & Goodman, Washington, for appellee.

Before Clevenger, Rader, and Gajarsa, circuit judges.

Clevenger, J.

David M. Rapoport ("Rapoport") appeals from a final decision of the Board of Patent

Appeals and Interferences of the United States Patent and Trademark Office ("Board") dated February 29, 2000. The real parties in interest in this interference are: (1) New York University ("NYU"), assignee of Rapoport; (2) the Board of Trustees of the Leland Stanford Junior University ("Stanford"), assignee of William C. Dement ("Dement") and Mark R. Rosekind ("Rosekind"); and (3) the Bristol-Myers Squibb Company ("Bristol-Myers"), assignee of Jeffrey L. Schwimmer ("Schwimmer"). Collectively, Dement, Rosekind, and Schwimmer will be referred to herein as "Dement et al."

The Board awarded judgment of priority as to the sole count of the interference in favor of Dement et al., and further ordered that Dement et al. are entitled to a patent containing claims 1-13 of U.S. Patent Application No. 07/695,325 ("the '325 application"), filed May 3, 1991, and that Rapoport is not entitled to a patent containing claims 1-12 of U.S. Patent Application No. 07/479,693 ("the '693 application"), filed February 14, 1990. We affirm.

I

The subject matter at issue in this case is a method for the treatment of sleep apnea. Generally, sleep apnea refers to the transient cessation of breathing during sleep. As described by the Board:

Sleep apneas comprise a spectrum of disorders with varying severity and morbidity and are usually classified as being an obstructive, central, or mixed apnea, depending on the presence or absence of respiratory efforts during the periods in which airflow has ceased. Obstructive and mixed apneas occur with greatest frequency with the most familiar being obstructive sleep apnea syndrome in which sporadic recurring collapse of the patient's upper airway occurs during sleep. If the collapse is complete, there is no air exchange at the nose and mouth and breathing is interrupted. The usual result is a partial arousal and a return to normal breathing.

In most instances, patients suffering from sleep apnea have no knowledge or memory of the apnea episodes, but find themselves constantly suffering from fatigue and daytime drowsiness for no apparent reason. Consequently, due to this chronic lack of proper rest, patients who suffer from sleep apnea often ex-

hibit secondary symptoms of anxiety, depression, fatigue, malaise, irritability, anger, hostility, and other similar problems.

The count in this interference relates to the treatment of sleep apnea by administering a therapeutically effective amount of certain azapirone compounds such as buspirone "to a patient in need of such treatment."

On February 12, 1990, Schwimmer filed U.S. Patent Application No. 07/478,820 ("the '820 application"). Claim 1 of the '820 application as originally filed reads in relevant part:

1. A method for treatment of sleep apneas comprising administration of a therapeutically effective regimen of a Formula I azapirone compound or a pharmaceutically effective acid addition salt thereof to a patient in need of such treatment

There is no dispute that although buspirone is an azapirone compound, the azapirone compounds of Schwimmer's Formula I exclude buspirone. On the same day, Dement, Rosekind, and Schwimmer jointly filed U.S. Patent Application No. 07/479,803 ("the '803 application"). Original claim 1 of the '803 application reads as follows in its entirety:

1. A method for treatment of sleep apneas comprising administration of a therapeutically effective regimen of buspirone or a pharmaceutically effective acid addition salt thereof to a patient in need of such treatment.

Two days later, on February 14, 1990, Rapoport filed the '693 application. Claim 1 of the '693 application reads as follows in relevant part:

1. A method for treatment of sleep apneas comprising administration of a therapeutically effective regimen of a Formula I azapirone compound or a pharmaceutically effective acid addition salt thereof to a patient in need of such treatment

The azapirone compounds of Rapoport's Formula I include buspirone, and claim 6 of Rapoport's '693 application is specifically directed to buspirone.

On February 12, 1991, Schwimmer filed U.S. Patent Application No. 07/657,332 ("the '332 application") as a continuation of the '820 application, and on May 3, 1991, Dement, Rosekind, and Schwimmer jointly filed the '325 application as a continuation-in-part of the '803 and '332 applications. Original

claim 1 of the '325 application reads as follows in relevant part:

1. A method for treatment of sleep apneas comprising administration of a therapeutically effective amount of a Formula I azapirone compound or a pharmaceutically effective acid addition salt thereof to a patient in need of such treatment

The azapirone compounds of Formula I in the context of the '325 application include buspirone, and claim 7 of the '325 application is specifically directed to buspirone.

On January 10, 1992, an interference was declared, and Dement *et al.* were accorded the benefit of the February 12, 1990, filing date of the '820 and '803 parent applications and therefore designated as the senior party. Count 1 of the interference, the only count at issue, reads in pertinent part as follows:

- A method for treatment of sleep apneas comprising administration of a therapeutically effective amount of a Formula I azapirone compound or a pharmaceutically effective acid addition salt thereof to a patient in need of such treatment

The azapirone compounds of Formula I in the context of the interference count include buspirone. Claims 1-12 of Rapoport's '693 application and claims 1-13 of the Dement *et al.* '325 application correspond to the count.

On June 10, 1992, Rapoport filed a Motion for Judgment pursuant to 37 C.F.R. § 1.633(a) in which he argued, *inter alia*, that the subject matter of the count was not patentable to Dement *et al.*, on the grounds that it was anticipated and/or rendered obvious pursuant to 35 U.S.C. § 102(a) and/or 35 U.S.C. § 103 by a prior art reference authored by Rapoport. This reference, entitled "Buspirone: Anxiolytic Therapy with Respiratory Implications," was published in *Family Practice Recertification* in September 1989, at pages 32-37 of Vol. 11, No. 9 (Supplement) ("the FPR Publication"). We note that the FPR Publication does not constitute a statutory bar against either Dement *et al.* or Rapoport, since it was published less than one year before the priority filing date of the '325 and '693 applications. 35 U.S.C. §§ 102(a) and 102(b) (1994). However, because the FPR Publication was authored by Rapoport, it can be cited as prior art against Dement *et al.*, but not against Rapoport. 35 U.S.C. § 102 (1994); *In re Katz*, 687 F.2d 450, 454, 215 USPQ 14, 17 (CCPA

1982). Dement *et al.* do not contest the fact that the FPR Publication is a prior art reference that may be cited against them in this interference.

On October 29, 1992, pursuant to 37 C.F.R. § 1.602(b), Dement and Rosekind disclosed that they were obligated to assign their rights in the '325 application to Stanford, and Schwimmer disclosed that he was obligated to assign his rights to Bristol-Myers. Approximately eight months later, on June 21, 1993, Dement *et al.* explicitly stated on the record that Schwimmer was the sole inventor of the use of most of the azapirone compounds covered by the count except for buspirone in the treatment of sleep apnea. On July 9, 1993, Rapoport filed a Second Motion to Accept Belated Filing Of Preliminary Motion Under 37 C.F.R. § 1.633(a) ("Rapoport's Motion to Accept Belated Filing"), along with a Motion for Judgment Under C.F.R. § 1.633(a) ("Rapoport's Belated Motion for Judgment") arguing that claims in the Dement *et al.* '325 application are unpatentable under 35 U.S.C. § 102(g) and/or § 103 over the prior invention of claims 7 and 13 of Dr. Dement, which were invented by a different inventive entity.

On April 12, 1996, the Board rendered a decision which, *inter alia*, denied Rapoport's June 10, 1992, Motion for Judgment, denied Rapoport's Motion To Accept Belated Filing, and dismissed Rapoport's Belated Motion for Judgment as being untimely. These decisions were adhered to in a decision for reconsideration dated September 6, 1996. The Board rendered its final decision on February 29, 2000.

In its decision dated April 12, 1996, the Board found that: (1) Rapoport had established a conception date of May 13, 1988; (2) Dement was entitled to a 1986 date of conception; and (3) the conception by Dement inures to the benefit of Dement *et al.* pursuant to 35 U.S.C. § 116. Based on these findings, the Board awarded priority of the invention of the interference count to Dement *et al.* Before this court, Rapoport does not contest either the ultimate priority determination in favor of Dement *et al.* or the underlying findings by the Board.

Instead, on appeal, Rapoport argues that the Board erred in not finding that all of the Dement *et al.* claims corresponding to the count are either anticipated by the FPR Publication or rendered obvious by the FPR Publication in combination with admissions allegedly made

in the Dement *et al.* '325 application. Rapoport also argues that it was an abuse of discretion for the Board to deny Rapoport's Motion to Accept Belated Filing and to dismiss Rapoport's Belated Motion for Judgment as being untimely. Finally, Rapoport argues that—in the event that this court finds that all of the Dement *et al.* claims are unpatentable in view of the FPR Publication—the Board erred in awarding judgment on priority in favor of Dement *et al.* We have jurisdiction to hear this appeal pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994) and 35 U.S.C. § 141 (1994).

II

To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either expressly or inherently. *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). Anticipation is a question of fact, and we uphold decisions of the Board on factual matters if there is substantial evidence in the record to support the Board's findings. *In re Hyatt*, 211 F.3d 1367, 1371-72, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Whether a claim limitation is inherent in a prior art reference is a factual issue on which evidence may be introduced. *In re Schreiber*, 128 F.3d at 1477, 44 USPQ2d at 1431. The Board's determination of obviousness is a question of law subject to *de novo* review. However, the Board's factual determinations underlying its rulings on anticipation and obviousness are reviewed under the substantial evidence test. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999); *In re Gartside*, 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1775-76 (Fed. Cir. 2000). Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *In re Gartside*, 203 F.3d at 1312, 53 USPQ2d at 1773 (quoting *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938)).

The Board's decisions to deny Rapoport's Motion to Accept Belated Filing and to dismiss Rapoport's Belated Motion for Judgment are reviewed for abuse of discretion. *Abrutyn v. Giovanniello*, 15 F.3d 1048, 1050-51, 29 USPQ2d 1615, 1617 (Fed. Cir. 1994). An abuse of discretion occurs if the decision (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact finding; or (4) involves a record that contains no

evidence on which the Board could rationally base its decision. *Id.*

As noted above, Rapoport has not requested review of the underlying factual determinations or of the legal bases for the Board's award of priority to Dement *et al.* Instead, Rapoport merely questions the Board's action of awarding priority to Dement *et al.* at the same time as holding the Dement *et al.* claims patentable. This issue involves the Board's legal conclusions regarding priority, conception, and reduction to practice, which we review *de novo*. *Eaton v. Evans*, 204 F.3d 1094, 1097, 53 USPQ2d 1696, 1698 (Fed. Cir. 2000).

III

We first address Rapoport's argument that the Dement *et al.* claims corresponding to the count are anticipated by the FPR Publication. Because the first step of a patentability or invalidity analysis based on anticipation and/or obviousness in view of prior art references is no different from that of an infringement analysis, we must start by interpreting any disputed terms in the interference count. *Amazon.com, Inc. v. Barnesandnoble.com, inc.*, 239 F.3d 1343, 1351, 57 USPQ2d 1747, 1751-52 (Fed. Cir. 2001). Only when a claim is properly understood can a determination be made whether the claim "reads on" an accused device or method, or whether the prior art anticipates and/or renders obvious the claimed invention. *Id.*

A

Rapoport argues on appeal, as he did before the Board, that it is reasonable to interpret the phrase "method for treatment of sleep apneas" in the interference count broadly to include both (1) treatment of anxiety secondary to sleep apnea and (2) treatment of the underlying sleep disorder itself. In contrast, Dement *et al.* agree with the Board, which found that in the context of the present interference, treatment of the underlying sleep apnea disorder itself is distinct from treatment of anxiety and other secondary symptoms related to sleep apnea. Based on this finding, the Board interpreted the term "treatment of sleep apneas" in the interference count as being limited to treatment of the underlying sleep apnea disorder itself. We review the Board's legal conclusion, as we do all rulings on claim interpretation, without deference. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1456, 46

USPQ2d 1169, 1174-75 (Fed. Cir. 1998) (en banc); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370, 38 USPQ2d 1461 (1996). Upon reviewing the record, we discern no error with the Board's interpretation.

First, we note that the disputed phrase "treatment of sleep apneas" is technically part of the preamble of the interference count, because it appears before the transition word "comprising." However, there is no dispute in this case that the phrase should be treated as a claim limitation. Moreover, without treating the phrase "treatment of sleep apneas" as a claim limitation, the phrase "to a patient in need of such treatment" would not have a proper antecedent basis.

[1] In support of his proposed broad interpretation for "treatment of sleep apneas," Rapoport relies on the following passage from the written description of the Dement *et al.* '325 application:

There are two aspects to the use of azapirones in treating sleep apneas. The first is that the administration of an azapirone effectively reduces the frequency and severity of the apnea episodes during sleep. This is reflected in significantly increased undisturbed sleep and a significant increase in blood oxygen levels. The second aspect involves azapirone alleviation of the symptomatology associated with the occurrence of sleep apneas. The azapirone treatment alleviates the sleep apnea-related symptoms of anxiety, depression, fatigue, malaise, irritability, anger and hostility.

According to Rapoport, this passage supports the notion that "treatment of sleep apneas" in the interference count should include both treatment of the underlying disorder and the "symptomatology associated with the occurrence of sleep apneas." However, to the extent that the above passage suggests that "alleviation of the symptomatology associated with the occurrence of sleep apneas" constitutes an aspect of the use of azapirones in treating sleep apneas, the intrinsic record in this case leads to the conclusion that "treatment of sleep apneas" refers only to treatment of the underlying sleep apnea disorder.

First, the plain language of the interference count unambiguously refers to "treatment of sleep apneas" narrowly defined, and does not also include by its plain terms "treatment of

symptoms associated with sleep apneas." See *Davis v. Loesch*, 998 F.2d 963, 968, 27 USPQ2d 1440, 1444 (Fed. Cir. 1993) ("Interference counts are given the broadest reasonable interpretation possible, and resort to the specification is necessary only when there are ambiguities inherent in the claim language or obvious from arguments of counsel.") (citations omitted); *In re Hyatt*, 211 F.3d at 1372, 54 USPQ2d at 1667 (during examination proceedings, claims are given their broadest reasonable interpretation consistent with the specification). Here, Rapoport relies on the written description of the Dement *et al.* '325 application in an unsuccessful attempt to broaden the phrase "treatment of sleep apneas" from its ordinary meaning, which narrowly refers to treatment of the underlying disorder itself.

Contrary to Rapoport's assertions, the written description of the Dement *et al.* '325 application actually confirms the Board's interpretation, and explicitly defines "sleep apneas":

In the context of this invention, sleep apneas comprise all the sub-categories such as those caused by upper airway obstruction; those whose origins arise in the central nervous system; and those of a mixed type with contribution from both components.

This passage indicates that the term "treatment of sleep apneas" refers to reducing or eliminating sleep apneas caused by upper airway obstructions, sleep apneas whose origins arise in the central nervous system, and sleep apneas of a mixed type.

As further support for the Board's position, the Summary of the Invention in the Dement *et al.* '325 application states that "[f]or use in the instant method oral administration of a dose of from about 10 to 60 mg of an azapirone at the hour of sleep is usually employed." This description is consistent with treatment of the underlying sleep apnea disorder, which by definition manifests itself during sleep, and inconsistent with treatment of anxiety and other symptoms commonly associated with sleep apnea, which would obviously manifest themselves while a patient is awake.

Next, in a portion of the Detailed Description of the Invention not limited to any particular embodiment, the Dement *et al.* '325 application states as follows:

The present invention concerns a method for treating sleep apneas comprising obstructive, central and mixed apneas, in a patient population that ranges from infants to geriatric-aged individuals.

Once again, this passage defines sleep apneas in terms of the underlying respiratory disorder and uses the term "treating sleep apneas" in a manner that is consistent with the Board's interpretation.

Finally, when describing the effectiveness of the sleep apnea treatment method that is disclosed and claimed in the Dement *et al.* '325 application, the discussion is limited to the treatment's effect on the underlying sleep apnea disorder, and does not mention the treatment's effect on the associated symptomatology:

The effectiveness of azapirone treatment of patients suffering from sleep apneas can be exemplified by clinical experience with buspirone. Single dose administration of buspirone, given at bedtime to patients suffering from obstructive sleep apnea, resulted in increased sleep efficiency with experimentally derived measurements showing a gain in total sleep time and a marked reduction in episodes of sleep disturbance. One of the most consistent physiological measurements of improvement was a 10 to 20% increase in blood oxygen levels, an indication of improved respiratory efficiency.

In other words, Dement *et al.* noted that treating patients suffering from obstructive sleep apnea with buspirone at bedtime had a measurably beneficial effect on the underlying sleep apnea disorder (i.e., increased sleep efficiency, gain in total sleep time, significant reduction in episodes of sleep disturbance, and improved respiratory efficiency). However, Dement *et al.* made no mention in the written description of the '325 application of specific evidence of the treatment's effect on the symptomatology commonly associated with sleep apnea.

We therefore conclude that the Board was correct in interpreting "treatment of sleep apneas" as being limited to treatment of the underlying sleep apnea disorder, i.e., reducing the frequency and severity of the apnea episodes during sleep.

B

Having construed the disputed term in the interference count and affirmed the Board's

interpretation, we can properly address the merits of Rapoport's anticipation argument. The Board found that the disclosure of the FPR Publication was limited to treatment of anxiety in patients suffering from sleep apnea with buspirone, and did not address treatment of the underlying sleep apnea disorder. What a reference teaches is a question of fact. *In re Beattie*, 974 F.2d 1309, 1311, 24 USPQ2d 1040, 1041-42 (Fed. Cir. 1992). Therefore, we review the Board's characterization of the disclosure in the FPR Publication for substantial evidence. *In re Gartside*, 203 F.3d at 1316, 53 USPQ2d at 1775-76. The record indicates that substantial evidence supports the Board's factual findings regarding the FPR Publication.

[2] There is no disclosure in the FPR Publication of tests in which buspirone is administered to patients suffering from sleep apnea with the intent to cure the underlying condition. As the Board correctly found, the FPR Publication focuses on the treatment of anxiety with buspirone, and indicates that buspirone has potential as a primary treatment for dyspnea (which simply refers to difficulty in breathing in general).

For example, a passage in the FPR Publication mentions the possibility of administering buspirone to patents suffering from sleep apnea, but this is for the purpose of treating anxiety in such patients, not for the purpose of treating the sleep apnea disorder itself:

Buspirone thus appears to be an anxiolytic agent with a profile of respiratory effects that make it potentially safer to use for patients with impaired respiratory function and for patients with diseases such as obstructive sleep apnea, when use of ventilatory depressants would be clearly dangerous.

Rapoport concedes as much:

While this passage does not disclose administering buspirone with the intent of treating the sleep apnea *per se*, such an explicit intent is not necessary in order to anticipate the claims of Dement corresponding to the count.

Rapoport Opening Brief before the Board filed July 5, 1994. In a nutshell, using Rapoport's own words from its Opening Brief before the Board, Rapoport's theory on anticipation is as follows:

As long as one administers buspirone to a patient with sleep apnea in a therapeutically

effective amount, at least claims 1, 2, 6 and 7 of the Dement et al [sic] application underlying the present proceeding are fully anticipated.

In other words, according to Rapoport, neither the reasons for administering buspirone to the patient nor the time of administration are relevant. Instead, according to Rapoport, the only requirement of the count is that the patient suffer from sleep apnea. Given our disagreement with Rapoport's proposed claim interpretation, this argument cannot succeed.

Moreover, the need for tests to confirm safety for treating anxiety in patients with sleep apnea is indicated in the very next sentence of the FPR Publication relating to treating patients suffering from anxiety: "The preliminary results found among healthy subjects need to be confirmed by directly testing patients who need anxiolytic therapy." Thus, even the *proposed* testing in the FPR Publication is limited to the treatment of patients suffering from anxiety, not from sleep apnea. Moreover, the lack of information concerning administration of buspirone to patients while sleeping is indicated in Table 3 of the FPR Publication, where the entry under "Buspirone" regarding its effect on upper airway tone during sleep is "Undetermined."

The Board also correctly found that the FPR Publication does not show administering buspirone in any specific amounts to patients suffering from sleep apnea. Rather, the FPR Publication discloses administering single oral doses of 10 mg to nine normal volunteers. It also discloses administering buspirone in an amount of 10 mg three times a day to two patients with "severe alveolar hypoventilation" who needed anxiolytic therapy to facilitate use of a nocturnal ventilator. There is no dispute that none of these patients are reported as suffering from sleep apnea in the FPR Publication.

In contrast, as mentioned earlier, the Dement *et al.* '325 application discloses that based on clinical experience, administration of a single dose of buspirone at bedtime to patients suffering from obstructive sleep apnea resulted in a marked reduction in episodes of sleep disturbance, and further discloses administration of 20-40 mg of buspirone at the hour of sleep to an average adult.

We note that there is no mention in the FPR Publication of administering buspirone to a patient at bedtime. The significance of this

fact, of course, is that sleep apnea, by definition, occurs during sleep. In one of the two tests mentioned in the FPR Publication, a single 10 mg dosage was given at an unspecified time, while in the second test buspirone was administered in doses of 10 mg three times a day, once again without specifying administering the buspirone at bedtime.

Finally, we note that Rapoport argues that the FPR Publication inherently anticipates the count even under the Board's claim interpretation. See *In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995) (noting that a reference anticipates a claim if it discloses the claimed invention such that a skilled artisan could take the teachings of the reference in combination with his own knowledge of the particular art and be in possession of the invention) (citations omitted). According to Rapoport:

The anxiolytic amount of buspirone taught by the FPR publication still inherently anticipates in view of the fact that the Dement et al. application contains disclosures that anxiolytic amounts of buspirone overlap the preferred therapeutically effective amounts of buspirone disclosed in the Dement et al. application for reducing the frequency and severity of the apnea episodes during sleep. Specifically, Rapoport bases his argument on the observation that the Dement et al. application specifies administration of buspirone at the hour of sleep in dosages of about 20-40 mg for an average adult. Next, Rapoport notes that the FPR Publication discloses a dosage of 10 mg of buspirone three times a day for treatment of anxiety. The conclusion to be drawn from these observations, according to Rapoport, is as follows:

The fact that the Dement et al. specification recites a preferred range of 20-40 mg of buspirone administered at the time of sleep does not suggest that the administration of 10 mg of buspirone at the time of sleep, particularly when there have been two other dosages of 10 mg each during the course of the day, will have no therapeutic effect. The claims do not require optimal amounts, only therapeutically effective amounts. If 10 mg of buspirone has any effect on the treatment of sleep apnea, even if not optimum, the claim is anticipated.

We conclude that Rapoport's inherency argument is without merit. First, Rapoport ne-

eds to point out that the FPR Publication explicitly states that the patients who received the 10 mg doses of buspirone three times a day were suffering from "severe alveolar hypoventilation who needed anxiolytic therapy to facilitate the use of a nocturnal ventilator," not from sleep apnea. Second, Rapoport's argument is based on at least two speculative assumptions: (1) that a treatment regimen of three doses a day would necessarily include an administration "at the time of sleep;" and (2) that administering two 10 mg doses of buspirone at unspecified times throughout the day in conjunction with a 10 mg dose of buspirone at bedtime would necessarily result in a "therapeutically effective amount" of buspirone treatment for the purpose of treating the underlying sleep apnea disorder. "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Cont'l Can. Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) (emphasis in original) (citations omitted). Rapoport has not attempted to demonstrate that the proposed dosage regimen in the FPR Publication would necessarily result in a therapeutically effective amount. Instead, Rapoport merely argues that the "preferred" range of 20-40 mg described in the Dement et al. application does not rule out the thrice-daily 10 mg doses of buspirone discussed in the FPR Publication in the context of patients who are not even described as suffering from sleep apnea. The burden of proof, of course, is on Rapoport, by a preponderance of the evidence. *Bruning v. Hirose*, 161 F.3d 681, 685-86, 48 USPQ2d 1934, 1937-38 (Fed. Cir. 1998) (pending applications invoke the preponderance of the evidence standard).

Most importantly, however, as we noted at the outset, the issue of anticipation—whether by inherency or otherwise—is a question of fact, and we uphold decisions of the Board on factual matters if there is substantial evidence in the record to support the Board's findings. *In re Hyatt*, 211 F.3d at 1371-72, 54 USPQ2d at 1667. In this case, as detailed above, our review of the record indicates that the Board's findings are amply supported by the evidence. The Board considered the evidence of record and correctly ruled against Rapoport on this issue.

Therefore, for all the reasons stated above, we find that the Board's conclusion that the FPR Publication does not disclose administration of buspirone to patients suffering from sleep apnea to treat sleep apnea is supported by substantial evidence.

IV

Next, we address Rapoport's argument that the Board's action of denying Rapoport's Motion to Accept Belated Filing was an abuse of discretion. As noted earlier, this motion alleged that the Dement *et al.* claims are either anticipated under 35 U.S.C. § 102(g) and/or rendered obvious under 35 U.S.C. § 102(g) and/or § 103 over the prior invention of claims 7 and 13 of Dr. Dement, which were invented by a different inventive entity.

[3] Our review of the record indicates that the Board denied the Motion to Accept Belated Filing on the basis that Rapoport had filed it on July 9, 1993, approximately eight months after Rapoport should have been aware of the facts upon which the motion was based. As the Board correctly noted, Rapoport should have been aware when the interference was declared that the notice of interference accorded Dement *et al.* the benefit of the abandoned '820 application, wherein Dr. Schwimmer signed an oath stating that he is the sole inventor of the claimed subject matter (*i.e.*, using azapirones other than buspirone to treat sleep apnea). Moreover, the Board correctly indicated that Rapoport learned or should have been aware of the grounds of unpatentability urged in the preliminary motion for judgment on or about October 29, 1992, when Dement *et al.* filed a notification pursuant to 37 C.F.R. § 1.602(b) stating that Drs. Dement and Rosekind were obligated to assign their entire interest to Stanford and that Dr. Schwimmer was obligated to assign his entire interest to Bristol-Myers.

In view of the above, we conclude that the Board did not abuse its discretion by denying Rapoport's Motion to Accept Belated Filing or in dismissing the preliminary motion for judgment, because there is evidence of record upon which the Board could base its decision that Rapoport did not show "sufficient cause" why the motion was not filed sooner, as required by 37 C.F.R. § 1.645(b).

V

Finally, we turn to Rapoport's argument that the Board erred in awarding judgment on

priority in favor of Dement *et al.* against Rapoport, notwithstanding the possibility that all of the Dement *et al.* claims could be ruled unpatentable to Dement *et al.* As Rapoport acknowledges, we need not reach this issue, given our conclusion that the Board did not err in finding that the Dement *et al.* claims were not rendered unpatentable by the FPR Publication.

VI

For the reasons set forth above, the decision of the Board is, in all respects,

AFFIRMED.

Earth Flag Ltd. v. Alamo Flag Co.

**U.S. District Court
Southern District of New York
No. 00 Civ. 3961 (SAS)
Decided May 17, 2001**

COPYRIGHTS

[1] Elements of copyright — Statutory elements — Originality (§ 205.0707)

Plaintiff's "Earth Flag," which consists of two identical circular photographs of Earth taken from space, sewn onto each side of dark blue synthetic fabric, has no non-trivial, original component that entitles it to copyright protection, since work is nothing more than public domain photograph transferred from medium of paper to medium of fabric, and fact that reproduction in new medium of fabric required some skill and vision does not render flag protectable, and since none of remaining features of flag contain any original expression.

[2] Elements of copyright — Statutory elements — Originality (§ 205.0707)

Plaintiff's "Earth Flag," which lacks any non-trivial, original component, is not entitled to copyright protection, since work and energy expended in developing flag, filing certificates of registration, and marketing it and popularizing it as symbol for environmental movement neither demonstrate "true artistic skill" nor contribute to flag's protectability.

is not given any of the presumptions of section 7(b) of the Act. These include "ownership of the mark," and ownership "imparts prima facie evidence of use." *J.C. Hall Co. v. Hallmark Cards, Inc.*, 52 CCPA 981, 984, 340 F.2d 960, 962, 144 USPQ 435, 437 (1965). *Accord*, *Massey Junior College, Inc. v. Fashion Institute of Technology*, 492 F.2d 1399, 1402, 181 USPQ 272, 274 (CCPA 1974). Accordingly, the owner of a mark on the Supplemental Register would have to affirmatively prove use of that mark. See *Aloe Creme Laboratories, Inc. v. Bonne Bell, Inc.*, 168 USPQ 246 (TTAB 1970). This contrasts with the presumption of continuing use of a mark by the owner of a registration on the Principal Register. *Gillette Co. v. Kempel*, 45 CCPA 920, 921-22, 254 F.2d 402, 404, 117 USPQ 356, 357 (1958).

Court of Customs and Patent Appeals

In re Marshall

No. 77-625 Decided June 30, 1978

PATENTS

1. Patentability — Anticipation — In general (§51.201)

Patentability — Anticipation — Combining references (§51.205)

Rejections under 35 U.S.C. 102 are proper only when claimed subject matter is identically disclosed or described in prior art; in other words, all material elements recited in claim must be found in one unit of prior art to constitute anticipation; In re Samour, 197 USPQ 1, did not disturb this principle.

2. Patentability — Anticipation — In general (§51.201)

Accidental or unwitting duplication of invention cannot constitute anticipation.

3. Patentability — Evidence of — Suggestions of prior art (§51.469)

Patentability — New use or function — In general (§51.551)

Drug's known disadvantages that would naturally discourage search for new uses of that drug may be taken into account in determining obviousness.

Particular patents — Weight Reduction

Marshall, Process for Weight Reduction, rejections of claims 1-9 reversed.

Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Edward M. Marshall, Serial No. 468,552, filed May 9, 1974. From decision rejecting claims 1-9, applicant appeals. Reversed; Markey, Chief Judge, with whom Baldwin, Judge, joins, dissenting in part, with opinion.

Edward D. O'Brian, Anaheim, Calif., for appellant.

Joseph F. Nakamura (Jack E. Armore, of counsel) for Commissioner of Patents and Trademarks.

Before Markey, Chief Judge, and Rich, Baldwin, Lane, and Miller, Associate Judges.

Lane, Judge.

This is an appeal from the decision of the Patent and Trademark Office (PTO) Board of Appeals (board) sustaining the examiner's rejection under 35 USC 102 of claims 1-4 and entering a new ground of rejection under 37 CFR 1.196(b) of claims 5-9 under 35 USC 103. We reverse both rejections.

Background

Invention

Normally, when food passes through the terminal region of the stomach, nerve endings there stimulate the release of two hormones, secretin and pancreaticozym. These hormones then trigger the production and release of pancreatic enzymes necessary for digestion in the small intestine.

Applicant's weight control process involves anesthetizing these nerve endings with an orally administered anesthetic containing 50-2,000 mg of oxethazaine. This prevents the release of secretin and pancreaticozym which in turn interferes with the production and release of the pancreatic enzymes. Thus, food passing through the small intestine is not digested and does not contribute calories to the body.

The following claims are before us on appeal:

1. In a weight control process in which a quantity of food is consumed

and passes through the gastrointestinal digestive tract of a living body the improvement which comprises:

said quantity of food including food-stuffs requiring digestion caused by pancreatic enzymes for absorption into the bloodstream from the small intestine,

periodically anesthetizing [sic] the nerve endings in the digestive tract which release hormones when contacted by food passing through the digestive tract so as to trigger the release of said pancreatic enzymes into the digestive tract by the pancreas prior to said quantity of food contacting said nerve endings only prior to the passage of food into said digestive tract, said anesthetization being carried out to an extent effective and at a time effective to inhibit said nerve endings from releasing sufficient hormones to cause the release of said pancreatic enzymes which will contact said food as it passes through the digestive tract,

said anesthetization serving to prevent the release of said hormones when said nerve endings are contacted by said quantity of food, this having the effect of preventing release of said enzymes by the pancreas to the digestive tract so that said food passes through the digestive tract without being digested so that it is [sic not] capable of being absorbed into the bloodstream as a consequence of the absence of said enzymes.

2. A weight control process as claimed in claim 1 wherein:

said nerve endings are anesthetized [sic] by orally taking a quantity effective to cause said inhibition of an anesthetic means coated with a coating means which is effective to delay the release of said anesthetic means until said anesthetic means reaches the vicinity of said nerve endings in the digestive tract.

3. A weight control process as claimed in claim 2 wherein:

said anesthetic means is oxethazaine.

4. A weight control process as claimed in claim 2 wherein:

said anesthetic means is orally taken with an adherence means for causing said anesthetic means to adhere to the interior of the digestive tract.

5. A weight control process as claimed in claim 4 wherein:

said adherence means is albumin and is admixed with said anesthetic means, said anesthetic means and said albumin

both being coated with said coating means.

6. A weight control process as claimed in claim 2 wherein:

from about 50 to about 2,000 milligrams of said anesthetic means are taken at one time, said time being prior to food being taken into the digestive tract.

7. A weight control process as claimed in claim 2 wherein:

from about 200 to about 800 milligrams of said anesthetic means are taken at one time, said time being prior to food being taken into the digestive tract.

8. A weight control process as claimed in claim 1 wherein:

said nerve endings are anesthetized [sic] by orally taking a quantity effective to cause said inhibition of an anesthetic means coated with a coating which will delay the release of said anesthetic means until said anesthetic means reaches the vicinity of said nerve endings in the digestive tract,

said anesthetic means is oxethazaine, and

from about 50 to about 2,000 milligrams of said anesthetic means are taken at one time, said time being prior to food being taken into the digestive tract.

9. A weight control process as claimed in claim 8 wherein:

said anesthetic means is orally taken with adherence means for causing said anesthetic [sic means] to adhere to the interior of the digestive tract, and

said adherence means is albumin and is admixed with said anesthetic [sic means], said anesthetic [sic means] and said albumin both being coated with said coating.

Prior Art

The reference relied upon are: the PHYSICIAN'S DESK REFERENCE 1522-23 (25th ed. 1971) (PDR); and J. Slayback, E. Swena, J. Thomas, L. Smith, The Pancreatic Secretory Response to Topical Anesthetic Block of the Small Bowel, 61 SURGERY 591 (1967) (Slayback).

The PDR describes drugs containing the anesthetic oxethazaine for the treatment of esophagitis, gastritis, peptic ulcer and irritable colon syndrome. The recommended adult oral dose of these drugs is one or two teaspoons (10-20 mg oxethazaine) four times daily, fifteen minutes before meals and at bedtime. The PDR expressly warns against exceeding the recommended dosage. Regarding the use of these drugs in the treatment of peptic ulcer, the PDR explains that topical appli-

cation of this local anesthetic inhibits the release of the acid-stimulating hormone, gastrin.

Slayback is an article reporting an investigation into the mechanism responsible for the release of the pancreatic secretory hormones, secretin and pancreozymin. Researchers found that application of the anesthetic oxethazaine HCl to isolated segments of the small intestine of surgically altered dogs caused a substantial reduction in the release of both secretin and pancreozymin. These results were consistent with the hypothesis that secretin and pancreozymin release is controlled by a local neural mechanism similar to the one which had been shown to control the release of the gastric secretory hormone, gastrin.

Proceedings Below

The examiner rejected claims 1-4 under 35 USC 102 as anticipated by the PDR and also rejected claims 1-9 under 35 USC 102/103 as anticipated or obvious over a patent to Pober.¹ The board affirmed the 102 rejection of claims 1-4 but reversed the 102/103 rejection of claims 1-9 and entered a new ground of rejection under 37 CFR 1.196(b) rejecting claims 5-9 under 35 USC 103 as obvious in view of the combined teachings of PDR and Slayback.²

Opinion

102 Rejection

[1] Rejections under 35 USC 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. In re Arkley, 59 CCPA 804, 807, 455 F.2d 586, 587, 172 USPQ 524, 526 (1972). In other words, to constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art. Soundsciber Corp. v. United States, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct.Cl. 1966). This basic principle of patent law has not been disturbed by our recent decision, In re Samour, 571 F.2d 559, 197 USPQ 1 (CCPA 1978), in which we affirmed a §102(b) rejection of claims

¹ U.S. patent No. 3,740,440, issued June 19, 1973, for "Method of Inhibiting Appetite for Food."

² The board does not explain why this new ground of rejection was not applied to claims 1-4 as well.

chemical compound based on a primary reference which disclosed the compound and additional references which established that a method of preparing the compound would have been obvious to one skilled in the art. In Samour, every material element of the claimed subject matter, the chemical compound, could be found in the primary reference, a disclosure of that compound.

[2] Applying this rule of law to the present case, we must reverse the board's rejection of claims 1-4 under 35 USC 102 since the primary reference, the PDR, does not disclose every material element of the claimed subject matter. These claims are directed to a weight control process. Applicant uses an effective amount of the anesthetic, oxethazaine, to inhibit release of the pancreatic secretory hormones, secretin and pancreozymin, in order to control weight. The PDR, however, teaches using drugs containing the anesthetic oxethazaine to inhibit release of the acid-stimulating hormone, gastrin, in order to treat esophagitis, gastritis, peptic ulcer and irritable colon syndrome. Nothing in the PDR remotely suggests taking oxethazaine to lose weight. If anyone ever lost weight by following the PDR teachings it was an unrecognized accident. An accidental or unwitting duplication of an invention cannot constitute an anticipation. In re Felton, 484 F.2d 495, 500, 179 USPQ 295, 298 (CCPA 1973).

103 Rejection

The board seems to have combined: (1) the teaching of the PDR that oral administration of oxethazaine inhibits release of gastrin, (2) the teaching of Slayback that secretin and pancreozymin release is controlled by a local neural mechanism similar to the one which controls release of gastrin, and (3) the art-recognized fact that secretin and pancreozymin control the production and release of pancreatic enzymes necessary for digestion in the small intestine, to conclude that applicant's method of controlling weight by anesthetizing the nerve endings that stimulate the release of secretin and pancreozymin would have been obvious.

The problem with this rejection is that nowhere in any reference is there any suggestion to control weight by turning off the production and release of pancreatic enzymes. Although it has long been known that pancreatic enzymes are involved in digestion, from this record it appears that

applicant is the first to suggest controlling weight by decreasing the quantity of pancreatic enzymes in the small intestine. To say this would have been obvious is to resort to impermissible hindsight.

[3] Moreover, the PDR appears to teach away from using effective amounts of the anesthetic oxethazaine since it expressly cautions against exceeding the recommended dose of 10-20 mg. This would not be an effective amount for controlling weight by appellant's process. Although Slayback, which discusses tests conducted solely on dogs, recognizes that higher concentrations of oxethazaine will produce "complete absence of stimulation of hormonal release," this does not negate the PDR warning with respect to the oral administration to humans. Known disadvantages of a drug which would naturally discourage the search for new uses of that drug may be taken into account in determining obviousness. See *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 483-484 (1966).

Accordingly, for the reasons set forth herein, the decision of the board is reversed.³

Reversed

Markey, Chief Judge, with whom Baldwin, Judge, joins, dissenting in part.

Though I wholeheartedly agree with the majority's treatment of the §102 issue, I respectfully dissent from the majority's conclusion of non-obviousness under §103.

The majority agrees that the board considered "the art recognized fact that secretin and pancreozymin control the production and release of pancreatic enzymes necessary for digestion in the small intestine." Nowhere in the record is there any dispute on that point. Moreover, the majority also recognizes that "it has long been known that pancreatic enzymes are involved in digestion."

Appellant and all others having ordinary skill in the art knew that pancreatic enzymes play a major role in the digestion of food. If food is not digested, it is excreted without being absorbed into the body. If

food is not absorbed, the body cannot gain weight. It follows, therefore, that decreasing pancreatic enzyme quantity (or eliminating it altogether) must decrease weight. The particular compound chosen by appellant to shut off or decrease the flow of pancreatic enzymes was known in the art and used for that purpose.

District Court, District of Columbia

Mobil Oil Corporation, et al.
v. Dann, Commissioner of Patents and Trademarks, et al.

No. 76-0021 Decided Feb. 28, 1978

PATENTS

1. Commissioner of Patents — Supervisory authority (§21.30)

Pleading and practice in Patent Office — Rules effect (§54.9)

Commissioner of Patents and Trademarks can grant conditional relief under Patent Rule 183; petitions under that rule are addressed to Commissioner's sound discretion on showing of "extraordinary situation when justice requires"; rule authorizes Commissioner to grant equally flexible forms of relief to do justice according to facts of individual cases due to that inherently flexible standard.

2. Commissioner of Patents — Supervisory authority (§21.30)

Pleading and practice in Patent Office — In general (§54.1)

Commissioner of Patents' action in granting extension of time to applicant that permitted time for appeal or filing civil action to expire following Board of Appeals' affirmation of rejection and sought extension only after learning that assertedly similar application was to be granted competitor, conditioned upon relinquishment of any right to patent on applicant's now-abandoned application, offends no statutory limitation, and fairly accommodates competing interests and equities of parties.

³ The board rejected only claims 5-9 under 35 USC 103. In the interest of judicial economy, we note that our reversal of that rejection is not based on any limitations of claims 5-9 not found in broader claims 1-4 as well.

Court of Customs and Patent Appeals

In re Shetty

No. 77-515 Decided Nov. 17, 1977

PATENTS

1. Patentability — Invention — Specific cases — Chemical (§51.5093)

It is obvious and there is sufficient motivation to person skilled in chemical or pharmaceutical arts to substitute ethylene link between adamantane ring and amine for structurally-similar prior art methylene link.

2. Patentability — Invention — In general (§51.501)

Patentability — Invention — Specific cases — Chemical (§51.5093)

Fact that claimed method might be inherent in teachings of prior art is immaterial if one of ordinary skill in art would not appreciate or recognize that inherent method; mere hindsight assertion that corresponding dosages of prior art compounds useful for combatting microbial infestation, in light of which claimed compound is obvious, renders claimed method for appetite control obvious is untenable; inherency of advantage and its obviousness are entirely different questions; obviousness cannot be predicated on what is unknown.

Particular patents — Adamantane Derivatives

Shetty, Anorectic Adamantane Derivatives and Method of Using Same, rejection of claim 52 affirmed; rejection of claims 2-5 and 51 reversed.

Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Bola Vithal Shetty, Serial No. 171,736, filed Aug. 13, 1971. From decision rejecting claims 2-5, 51, and 52, applicant appeals. Modified.

Carl A. Hechmer, Jr., and Edward A. Sager, both of Philadelphia, Pa., for appellant.

Joseph F. Nakamura (Jack E. Armore, of counsel) for Commissioner of Patents and Trademarks.

Before Markey, Chief Judge, Rich, Baldwin, and Lane, Associate Judges, and Morgan Ford, Associate Judge, United States Customs Court.

Rich, Judge.

This appeal is from that portion of the July 30, 1976, decision of the Patent and Trademark Office (PTO) Board of Appeals (board) rejecting claims 2-5, 51, and 52 in application serial No. 171,736, filed August 13, 1971, entitled "Anorectic Adamantane Derivatives and Method of Using Same." The board rejected the claims under 35 USC 103 on new grounds, as provided in 37 CFR 1.196(b), as obvious from Brake¹ in view of Narayanan,² Bernstein et al.,³ and Bernstein.⁴ We affirm the rejection of composition claim 52 and reverse the rejection of method claims 51 and 2-5.

The Invention

The invention pertains to a method, as defined in claims 51 and 2-5, of curbing appetite in animals by administering certain adamantane compounds.⁵ The invention also pertains to the unit dosage form of a composition for curbing appetite comprising such an adamantane compound and a pharmaceutically acceptable carrier as defined in claim 52.

In the specification, appellant identifies his claimed compounds as follows:

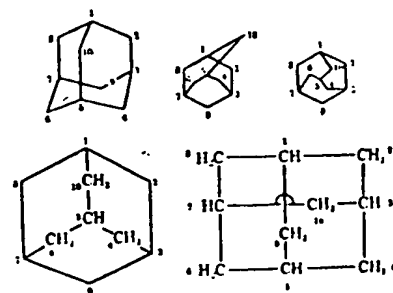
¹ U.S. Patent No. 3,489,802, issued Jan. 13, 1970, on application serial No. 610,779, filed Jan. 23, 1967.

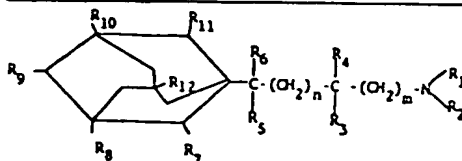
² U.S. Patent No. 3,501,511, issued Mar. 17, 1970, on application serial No. 661,781, filed Aug. 21, 1967.

³ U.S. Patent No. 3,270,036, issued Aug. 30, 1966, on application serial No. 493,899, filed Oct. 7, 1965.

⁴ U.S. Patent No. 3,320,249, issued May 16, 1967, on application serial No. 470,930, filed July 9, 1965.

⁵ Adamantane is the trivial name assigned to tricyclodecane. Its structural formula can be represented in any of the following ways:



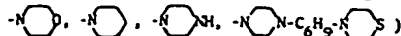


or their pharmaceutically acceptable acid addition salts, wherein:

R_1 = H, lower alkyl, aralkyl, aralkyl substituted with NH_2 , OH, OCH_3 , halogen, alkyl, NO_2 ; phenoxyalkyl or phenoxyalkyl substituted with NH_2 , OH, OCH_3 , halogen, alkyl, or NO_2 ; acyl such as formyl or acetyl.

R_2 = H, lower alkyl, COO-lower alkyl, aralkyl, aralkyl substituted with NH_2 , OH, OCH_3 , halogen, alkyl, NO_2 ; phenoxyalkyl or phenoxyalkyl substituted with NH_2 , OH, OCH_3 , halogen, alkyl, or NO_2 ; acyl such as formyl or acetyl.

R_1 and R_2 can be joined together to form, with the nitrogen, a heterocyclic ring (e.g.



R_3 = H, lower alkyl, or alkynyl

R_4 = H, lower alkyl, or alkynyl

R_5 = H, OH, halogen, or lower alkyl

R_6 = H, OH, halogen, or lower alkyl

R_7 and R_8 together may represent a carbonyl oxygen

R_9 = H, lower alkyl, halogen, hydroxy, alkoxy, amino or substituted amino, trifluoromethyl, sulfamyl, nitro, phenyl

R_9 , R_{10} , R_{11} , R_{12} , are any of R_9 ,

n = 0 to 4

m = 0 to 4

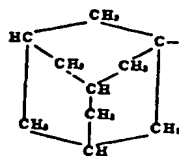
Independent claim 51 defines the "method of curbing appetite in an animal which comprises administering to the animal an amount effective to curb appetite of a compound" of the above formula.

The References

Brake describes a process for improving the yield of α -methyl multicyclic methylamines, one of which is α -methyl-1-adamantanemethylamine, illustrated as:

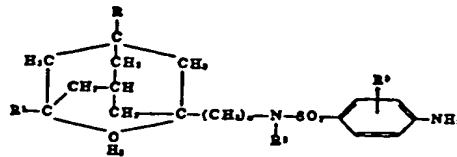


where R is * * *:



and is described as being useful as an antiviral agent in animals.

Narayanan teaches adamantyl sulfonamide compounds, useful as antimicrobial agents, e.g., as antiviral agents, of the formula:

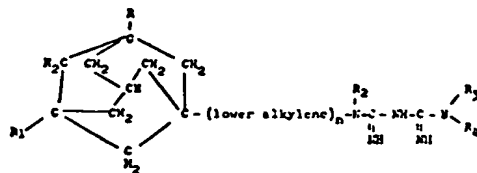


(I)

wherein R and R' each is hydrogen, halogen, lower alkyl, phenyl or phenyl-lower alkyl, R'' is hydrogen or lower alkyl, R''' is hydrogen, lower alkyl, lower alkoxy, halogen or halo-lower alkyl and n is 0, 1 or 2, and salts thereof.

Narayanan also teaches the use of his compounds in dosages corresponding to those of appellant.

Bernstein et al. pertains to adamantyl biguanides of the formula:



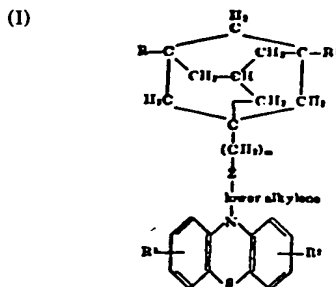
(I)

and to acid-addition salts thereof.

In Formula I, R and R' each is hydrogen, halogen, lower alkyl, phenyl or lower alkoxy, R_1 , R_2 and R_3 each is hydrogen, lower alkyl or phenyl-lower alkyl and n is 0 or 1.

These compounds are hypoglycemic agents effective in reducing blood sugar content in mammals.

The compounds of the Bernstein patent are illustrated by the following formula:



and to acid-addition and quaternary ammonium salts thereof.

These compounds are adamantyl derivatives of phenothiazines, therapeutically active as central nervous system depressants.

The Rejection

The examiner rejected appellant's claimed composition and method as obvious under 35 USC 103 in view of the teaching in Brake of administering to animals structurally similar adamantane derivatives "analogous" to those claimed. The Bernstein and Narayanan patents were cited to show similar compounds in the art. The examiner reasoned that the composition claim would have been obvious from the prior art because the respective compounds differ merely by a methylene group, i.e., the instant compounds have at least an ethylene link between the adamantane ring and the amine, whereas the prior art compound has a methylene link. This "minor molecular modification" was further asserted to be made obvious by the Bernstein and Narayanan patents, which disclose lower alkylene links between adamantane and other moieties and are directed to pharmaceutical uses.

The board treated the examiner's rejection as relying upon Brake alone and as citing the Bernstein and Narayanan patents to show the state of the art. The board did not sustain the rejection of claims 2-5, 51, and 52 as obvious from Brake alone because Brake's failure to disclose an amount of his compound effective as an antiviral agent renders unobvious the administration of "adjacent homologs of Brake's compound 'in an amount effective to curb appetite'" Similarly, the board did not agree that appellant's composition in an "appetite curbing amount" would have been obvious from Brake alone.

Under 37 CFR 1.196(b), the board made a new ground of rejection under 35 USC 103 for obviousness from Brake in view of the Bernstein and Narayanan patents. The board agreed with the examiner that appellant's compounds having an ethylene linkage would have been obvious in view of Brake's corresponding adjacent homolog (methylene linkage). Relative to the method claims, the board found sufficient motivation in the prior art to administer Brake's compound and adjacent ethylene "homologs" as antiviral agents, and concluded that administering appellant's compounds in appetite-curbing amounts would have been obvious from Brake and Narayanan since the amounts suggested by Narayanan to achieve antiviral effects encompass the amounts intended and claimed by appellant.

The Arguments

Appellant contends that, after refusing to sustain the examiner's rejection on the basis

Brake alone, the board erred in rejecting the method claims by considering Narayanan in addition to Brake. Appellant argues that Narayanan's reference to dosage for treating viral infection is an improper basis for rejection. It is urged that the board mistakenly assumed that appetite-suppressant effects of appellant's compounds would be readily recognized from treating virus-infected animals with a related compound. It is also urged that the board ignored differences in treatments for viral infection and obesity, and that therefore Narayanan's dosage cannot be said to result in effective anorexia. Relative to the claimed composition, appellant states that there is an appreciable difference between the structure of the compounds of the claim and the prior art compounds, and that the former would not have been obvious because the motivation to make the required structural variation is absent.

The solicitor responds by arguing that in the absence of comparative evidence of any unexpected difference in the properties of appellant's and Brake's compounds, the compounds of the claim would have been obvious from and unpatentable over the structurally closely related compound disclosed by Brake. It is argued that Brake and Narayanan render obvious appellant's pharmaceutical carrier and "unit-dosage-form." As to the method claims, the solicitor contends that Narayanan discloses adamantyl compounds as antiviral agents in dosages that correspond to and would suggest similar and inherently appetite-curbing amounts of the Brake antiviral compound. The solicitor supports the board position that because appellant's compounds are homologous and there is sufficient motivation in the prior art to administer Brake's compound as an antiviral agent, appellant's different purpose does not render the method claims unobvious.

Opinion

We note at the outset that the ethylene linkage of appellant's compound closest to the prior art (β -(1-adamantyl)- α -methylethylamine) is referred to by the examiner as "analogous" to the methylene linkage of Brake's α -methyl-1-adamantanemethylamine and by the board as a "homolog." Since the appellant has not challenged either of these classifications, we proceed on the assumption that he accepts the inference that his compounds, whether homologs or analogs, would be expected to have similar properties to the prior art compound. Whether the adamantyl compounds in question are properly classified according

to the usual definitions of "homolog" and "analog," we shall not consider inasmuch as appellant has not argued the point.

The solicitor has taken the position that absent comparative evidence demonstrating any unexpected difference in the properties of the compounds, the claimed composition would have been obvious from and unpatentable over the structurally closely related compound disclosed in Brake. On the other hand, appellant contends that the presence of the ethylene rather than the methylene group constitutes "an appreciable difference in the claimed compound and the prior art compounds," and relies on *In re Taborsky*, 502 F.2d 775, 183 USPQ 50 (CCPA 1974) for support of his argument that without some teaching of motivation to make the required molecular variation, a finding of obviousness based on structural similarity is improper.

[1] Regarding this issue of structural similarity, we agree with the solicitor and the PTO position. The examiner noted the difference of a mere methylene group between the compound of the claim and the prior art compounds, cited the Bernstein and Narayanan references showing the state of the art as prior art knowledge of use of lower alkylene links between adamantane and other moieties, and concluded that "this minor molecular modification would clearly be obvious to the pharmaceutical chemist." We do not accept appellant's contention that the adjacent alkylene link in question constitutes an "appreciable difference" in the compounds. We think that a person skilled in chemical and/or pharmaceutical arts would not hesitate to extend the alkylene linkage of the prior art compound. Further, we note that appellant's compound closest to the prior art and its synthetic preparation are disclosed in Narayanan as one of a group of compounds for producing his adamantyl sulfonamide. This leaves no room for doubt that the prior art knowledge renders appellant's compound structurally similar and provides sufficient motivation to make it.

Moreover, appellant has no basis for relying on *Taborsky*, supra. Unlike the present case, the prior art of record in *Taborsky* expressly limited the scope of "halogen" to exclude appellant's claimed fluorosalicylanilide compounds and stated "several disadvantages in practice" of free salicylanilides. 502 F.2d at 781, 183 USPQ at 55 (emphasis supplied). Appellant here has shown no such reason to preclude the conclusion that appellant's compounds are

structurally similar to the prior art compounds.

Confronted with PTO evidence of obviousness, appellant has offered no evidence of unobviousness, as by showing an actual difference in properties between his compounds and the prior art compounds. In *re Hoch*, 57 CCPA 1292, 428 F.2d 1341, 166 USPQ 406 (1970). Appellant merely shows that his novel compounds are appetite suppressants whereas the reference compounds are not so known. Further, appellant has not indicated whether his compounds are antiviral, as is Brake's prior art compound. Presented with such an absence of comparative or other evidence with respect to the properties of the compounds and the claimed composition, we hold that composition claim 52 would have been obvious from and unpatentable over the prior art.

[2] Regarding method claims 51 and 2-5, the solicitor agrees with the board that:

* * * the compounds of claim 51 are obvious from and unpatentable over the corresponding Brake compound and the Narayanan disclosure of a dosage which corresponds to appellant's disclosed appetite curbing dosage (therefore, inherently appetite curbing). [Emphasis added.]

We cannot accept this conclusion. The issue here is whether the claimed method of curbing appetite would have been obvious. That appellant's "amount effective to curb appetite" corresponds to or inheres in Narayanan's amount "to combat microbial infestation" does not persuade us of the obviousness of appellant's method. As this court said in *In re Naylor*, 54 CCPA 902, 905-06, 369 F.2d 765, 768, 152 USPQ 106, 108 (1966):

[Inherency] is quite immaterial if, as the record establishes here, one of ordinary skill in the art would not appreciate or recognize that inherent result. * * *

* * * we find nothing in the record which would afford one of ordinary skill reason to anticipate that a trial * * * [of the combined prior art teachings] would be successful in producing the polymer recited in the claims.

The Patent Office has failed to show a reasonable expectation, or some predictability, that Brake's compound would be an effective appetite suppressant if administered in the dosage disclosed by Narayanan. The mere hindsight assertion that corresponding dosages render appellant's method obvious is untenable.

Prior to appellant's disclosure, none of the adamantane compounds in any of the references before us suggested a use, much less a dosage, for curbing appetite. What we said in *In re Spormann*, 53 CCPA 1375, 1380, 363 F.2d 444, 448, 150 USPQ 449, 452 (1966), relative to inherency applies equally here:

As we pointed out in *In re Adams*, 53 CCPA 996, 356 F.2d 998, 148 USPQ 742 [(1966)], the inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.

Accordingly, the decision of the board is affirmed as to claim 52 and reversed as to claims 51 and 2-5.

District Court, N. D. Illinois, E. Div.

Radial Lip Machine, Inc.
v. International Carbide Corporation, et al.
No. 73 C 2945 Decided Sept. 29, 1977

PATENTS

**1. Pleading and practice in courts —
Jury trial — In general (§53.571)**

Accused patent and trademark infringers whose counterclaim to complaint seeking damages demands damages for breach of contract and fraud, and payment of royalties under assignment contract, and presents several grounds for declaratory relief that would have given rise to right to jury trial if raised by coercive action, are entitled to jury trial on all factual issues common to legal and equitable claims.

**2. Pleading and practice in courts —
Jury trial — In general (§53.571)**

Case in which only two competing corporations are involved, length of trial is estimated to be three weeks, there is no inundation of large number of documents, and patent validity is undisputed does not surpass limits of jury competence.

Action by Radial Lip Machine, Inc., against International Carbide Corporation, and Numac Research Industries, Inc., for patent and trademark infringement, in which defendants counterclaim for

declaratory and equitable relief and damages. On plaintiff's motion to strike defendants' demand for jury trial. Motion denied.

William T. Kirby, Roger McFadden, and Hubachek, Kelly, Rauch & Kirby, all of Chicago, Ill. (Robert L. Harmon, Richard H. Compere, and Hume, Clement, Brinks, William, Olds & Cook, Ltd., all of Chicago, Ill., and Vincent L. Barker, Jr., and Owen & Owen, both of Toledo, Ohio, of counsel) for plaintiff.

Jack E. Dominik, Alan B. Samlan, and Dominik, Knechtel, Godula & Demeur, all of Chicago, Ill., for defendants.

Marshall, District Judge.

This is a civil action for patent and trademark infringement and breach of contract. The parties are three corporations involved in the development, manufacture and marketing of a "radial lip" drill which is used in the metal cutting industry. Plaintiff has moved to strike defendants' demand for a jury trial.

The factual background reveals a series of corporate transactions which have transferred patent rights and created numerous contractual obligations between the parties. In the late 1960's officers of the two defendant corporations, International Carbide Corporation and Numac Research Industries, Inc., developed the radial lip drill and applied for patents on the drill, its grinding apparatus and the grinding method. Defendants then entered into various licensing agreements with other corporations. In 1969, defendants executed an agreement with Calar, a holding company. The Calar agreement basically provided that in return for 10% of Calar's stock and a share of outstanding rents and royalties from leases and licensing agreements, defendants would transfer their patent rights and those outstanding contracts and licenses to Calar. Defendants also agreed to perform certain research and technical services for Calar and received a license to make, sell and sharpen radial lip drills. Calar subsequently transferred its interest in the agreement, including the drill patents and trademark, first to its wholly owned sub-

¹ - The predecessor of these two corporations was Radial Lip Drill Company, which is to be distinguished from two other similarly named corporations in this case, Radial Lip Machine Corporation (a subsidiary of Calar) and Radial Lip Machine, Inc. (the present plaintiff).

the thinnest rock formation to be located.

Wyckoff was cited primarily for its disclosure that the spacing between the detectors and source is varied depending upon the terrain and the ability to separate adjacent strata together with the reference to a separation of two to fifty feet. There is no suggestion there, however, that two intervals of different spacing be measured in connection with a single traverse of a bore hole, much less that both measurements be of receiver-to-receiver intervals.

[1] In summary, we think the examiner and board erred in finding the appealed claims obvious over the teachings of Athy and Wyckoff. The rejection is based on an improper piecemeal reconstruction of the prior art made in light of appellants' disclosure and not taught or made obvious by the reference disclosures. See *In re Rothermel*, 47 CCPA 866, 276 F.2d 393, 125 USPQ 328.

The decision of the board is reversed.

53 CCPA 1375

Court of Customs and Patent Appeals

In re SPORMANN AND HEINKE

Appl. No. 7599 Decided July 21, 1966

PATENTS

1. Evidence — Judicial notice (§ 36.20)

Pleading and practice in Patent Office—Rejections (§ 54.7)

Although Board apparently took judicial notice of "spray drying" and although court has heard of spray drying, it is not a technique of which court would feel free to take judicial notice; if Patent Office wishes to rely on what "those familiar with spray drying would know," it must produce some reference showing what such knowledge consists of.

2. Patentability — Invention — In general (§ 51.501)

Inherency of an advantage and its obviousness are different questions; that which may be inherent is not necessarily known; obviousness cannot be predicated on what is unknown.

3. Construction of specification and claims — By specification and drawings — In general (§ 22.251)

Claims must be interpreted in light of specification.

Particular patents—Alkali Sulfites
Spormann and Heinke, Production of Solid Alkali Sulfites, claims 7 and 8 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Walter Spormann and Joachim Heinke, Serial No. 56,353, filed Sept. 16, 1960; Patent Office Group 110. From decision rejecting claims 7 and 8, applicants appeal. Reversed.

HERBERT B. KEIL and MATTHEW C. THOMPSON, both of Chicago, Ill., for appellants.

CLARENCE W. MOORE (GEORGE C. ROEMING of counsel) for Commissioner of Patents.

Before RICH, Acting Chief Judge, MARTIN, SMITH, and ALMOND, Associate Judges, and KIRKPATRICK, Judge.*

RICH, Acting Chief Judge.

This appeal is from the unanimous decision of the Patent Office Board of Appeals,¹ petition for reconsideration denied, affirming the examiner's rejection of process claims 7 and 8 in application serial No. 56,353, filed September 16, 1960, for "Production of Solid Alkali Sulfites." No claim has been allowed.

In essence, the invention is a process of producing alkali metal sulfites from alkali metal hydroxides and/or carbonates by spraying the latter, in aqueous solution, into a dry gas containing sulfur dioxide, the temperature and humidity of the gas being such as to immediately vaporize the water to the end that very little sulfate is produced. The sulfate results from oxidation of the sulfite but this apparently does not occur to any great extent if the sulfite is dry immediately upon its production. Sulfate is particularly likely to form when the treating gas contains a large amount of oxygen as do waste gases which it is desired to use for economic reasons.

Claim 7 reads (breakdown ours):

7. A process for the production of

* United States Senior Judge for the Eastern District of Pennsylvania, designated to participate in place of Chief Judge Worley, pursuant to provisions of Section 294(d), Title 28, United States Code.

¹ Consisting of Examiner-in-Chief Duncombe and Acting Examiners-in-Chief Behrens and Wyman, the latter writing the opinion.

solid alkali metal sulfite which comprises:

passing a finely dispersed aqueous solution of an alkali metal compound selected from the group consisting of sodium hydroxide, sodium carbonate, sodium bicarbonate, potassium hydroxide, potassium carbonate, potassium bicarbonate and mixtures thereof,

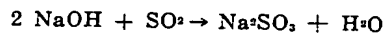
into a substantially dry gas containing sulfur dioxide,

maintaining the temperature of said dry gas at a level such that the water introduced with the solution and formed by the reaction of the alkali metal and the sulfur dioxide is immediately vaporized,

and thereafter separating from the gas the solid alkali metal sulfite which is formed by the reaction of the sulfur dioxide and the alkali metal compound.

Claim 8 differs from claim 7 in two respects. (1) The finely dispersed solution of alkali metal compound is passed "into an upwardly directed stream" of the dry gas containing sulfur dioxide and (2) the temperature of the dry gas is maintained "between about 20 and about 150°C."

A typical reaction, producing sodium sulfite from sodium hydroxide and sulfur dioxide, is



According to appellants' brief (emphasis ours):

It has long been known, of course, that sulfur dioxide (SO_2) can be reacted with alkali metal hydroxides or carbonates to produce sodium sulfite. Ordinarily, a solution of sodium hydroxide or the like is interacted with SO_2 gas. *There is one major drawback to the use of the known processes. The formed sulfite tends to oxidize, especially in the presence of heavy metal ions. Sodium sulfite, for example, oxidizes to form sodium sulfate (Na_2SO_4). To prevent oxidation of the sulfite it was considered necessary to exclude atmospheric oxygen by using a concentrated sulfur dioxide gas containing relatively minor amounts of free oxygen or by carrying out the reaction between the sulfur dioxide and the alkali metal hydroxide in an inert atmosphere. The need for concentrated SO_2 gases made it impossible to use roaster or waste gases containing sulfur dioxide which are formed in great quantities during the production of sulfuric acid. The protective measure described above is*

difficult to carry out especially in a commercial process. It has also been suggested that the oxidation of alkali sulfite be suppressed by adding substances to the solutions which are capable of binding heavy metal ions. In such processes, however, the substances which are added to bind the metal ions become impurities which contaminate the alkali sulfite.

A method was found by appellant-applicants whereby alkali sulfite can be obtained from alkali hydroxide or alkali carbonate and sulfur dioxide *without the concurrent formation of substantial amounts of alkali sulfate*. The process is carried out successfully without the addition of materials which contaminate the sulfite. In the process, a finely dispersed aqueous solution of an alkali metal hydroxide or carbonate or bicarbonate is passed (sprayed) into a substantially dry gas containing sulfur dioxide. *The temperature and relative humidity of the gas are maintained at such levels that the water introduced with the solution and formed by the reaction of the alkali metal and the sulfur dioxide is immediately vaporized*. Thereafter, solid alkali metal sulfite is separated from the gas. *The sulfite is formed instantly in the dry form and no longer is exposed to the action of oxygen which is present in the gas*. In the subject process, unlike the prior art processes, it is possible to use waste gases as a source of SO_2 , which gases contain large quantities of oxygen (as much as 50 parts of oxygen per part of SO_2).

In the process, therefore, a finely divided liquid and a gas are passed into the reaction zone and solid sodium sulfite particles and water vapor leave the reaction vessel. The exact point wherein the transition from liquid to solid and vapor occurs is not precisely known. What is known is that the water must be vaporized in the reaction zone leaving only vapor and solid alkali metal sulfite.

Much of this discussion also appears in appellants' specification.

The examiner finally rejected the claims as unpatentable "over any of" the following patents:

Haywood 2,210,405 Aug. 6, 1940

Aydelotte et al. 1,982,241 Nov. 27, 1934

Friedrich et al. 1,091,429 Mar. 24, 1914

Strickler 1,023,179 Apr. 16, 1912

In his Answer, the examiner also said,

"Appellants' process is considered nothing more than the application of this teaching of Friedrich et al. to a spray process such as is described in Aydelotte et al. Such a combination does not meet the provisions for patentability set forth in 35 U.S.C. 103."

The board said: "As recognized by the examiner, the rejection on Strickler appears to be cumulative but we will sustain the rejection as being one on Friedrich et al. in view of Aydelotte et al. or Haywood."

Friedrich et al. disclose a process for making sodium sulfites wherein a raw material such as sodium hydroxide or sodium carbonate is passed in a *solid, powdered* form through a horizontal rotating drum having radial plates or helical screw threads which cause the solid raw material to be turned and transported through the vessel. Sulfur dioxide gas is passed in countercurrent flow through the material within the drum. The solid, crushed raw material contains "a definite quantity of chemically combined or hygroscopic water" throughout the entire process, the amount of which "is so calculated in each individual case, that the heat of the reaction occurring on the absorption of the sulfurous acid gas [SO₂] will partially or completely evaporate the water, so that the finished product issuing from the apparatus will exhibit the required degree of moisture or dryness." The amount of moisture is apparently selected so that the final product will be free flowing yet dustless. The invention is described as an improvement over, and is contrasted with, the then known (1910) "wet" process by eliminating the equipment, power, and related expenses necessary for separation of product from solution.

Aydelotte et al. disclose a process for reducing the sodium hydroxide (caustic soda) content of solutions containing a mixture of sodium hydroxide and potassium hydroxide (caustic potash). The patentees' objective is to produce caustic soda-caustic potash solution mixtures of certain ratios which they use in making synthetic indigo, the sodium sulfite being a mere by-product. The mixture, in solution, is treated with waste gas containing sulfur dioxide, "either by bubbling the gas through the liquid, countercurrent spraying of the liquid into the gas, or other means until a test portion when evaporated to about 50° Bé., cooled to about 46°C. and filtered shows that the ratio of mixed caustic has been changed to 40% of caustic soda and 60% of caustic potash." The whole batch of solu-

tion is then evaporated to about 50° Bé. and cooled to 40°C. whereupon sodium sulfite precipitates and is separated by filtration or decantation. What remains is, of course, still a solution. According to the patentees, the "crude separated sodium sulfite, containing small amounts of potassium sulfite, occluded caustic, and other impurities may, for some purposes, be used without purification, or it may be partly purified by washing, depending on what purpose it is to be used for."

Haywood discloses a method for producing calcium sulfite, especially as filler for paper, whereby a suspension of milk of lime, contained in an "absorber" tank, is whipped up as a fine mist by an agitator into an overhead gas containing from 7% to 20% SO₂. The essentially water-insoluble calcium sulfite product falls back into the suspension. It is stated that the calcium sulfite suspension can then be pumped to a paper machine. Alternatively, the patent states:

If the material is to be shipped, it should first be dewatered to reduce it to a thick paste or a dry powder. However, if it is to be used near the source of manufacture in a watery suspension, it may be used directly * * *.

As to temperatures in the "absorber" where the reaction between liquid and gas occurs, the specification says:

This temperature under ordinary conditions will usually rise to about 70° C. If desired, the combustion gases [from a sulfur burner where SO₂ is generated for the process] * * * may be cooled to a certain extent by water introduced into the tower * * *. This, however is not essential and may be dispensed with, if desired. There is no objection to introducing the gases into the absorber at a temperature of between 400° and 550° C. [Emphasis ours.]

Strickler discloses a process for producing sodium sulfites, an object of which is to prevent the formation of sulfates through oxidation, which is appellants' principal object. However, in the Strickler process, SO₂ gas is passed into a suspension of sodium carbonate in a saturated solution of sodium sulfite. A temperature of about 49°C. (120°F.) is disclosed.

Comparing appellants' process with the prior art, clearly the basic chemical reaction embodied in their process is old, as their specification acknowledges. Aydelotte et al. would also suggest to one skilled in the art bringing

about this reaction by countercurrent spraying of a liquid containing caustic soda into a gas containing sulfur dioxide. The issue therefore is: would it be obvious to one of ordinary skill in this art to conduct the old reaction by such spraying under all the conditions set out in the claims and obtain appellants' results, i.e., would the invention as a whole have been obvious?

The board said:

Taking cognizance of the fact that spray drying is an old expedient for obtaining a solute in dry form, we fail to see that it is unobvious to modify the method taught by Friedrich et al. so that a solution of sodium carbonate, for instance, is passed in fine droplet form through the gaseous current comprising sulfur dioxide instead of the finely powdered carbonate of Friedrich, et al., particularly as Aydelotte et al. and Haywood do show, at least, that it is old to spray an alkaline hydroxide or carbonate solution through sulfur dioxide gas to obtain the corresponding sulfite.

Both appellants and Friedrich et al. obtain a dry sulfite and in such a simultaneous drying and chemical reaction process it is thought to be a mere difference in degree whether the water is present in such an amount as to dissolve the carbonate or is merely present as adhering water (Friedrich et al., page 2, lines 42 to 49). We note that Friedrich et al. only require that a sufficient amount of water be present to permit the chemical reaction to take place. Those familiar with spray drying know that dry products can be obtained even though a large amount of water may be present with the material to be dried.

Appellant urges that his product does not have much sulfate as a contaminant. Though not mentioned by Friedrich et al., this seems to be merely an additional characteristic inherent in their process. In re Arnold et al., 50 CCPA 1166, 1963 C.D. 400, 794 O.G. 502, 315 F.2d 951, 137 USPQ 330. [Emphasis ours.]

[1] The board's reference to "spray drying" appears to have been injected as something of which it was taking judicial notice, without having been mentioned in any reference of record. While Aydelotte et al. and Haywood both disclose spraying of some sort, neither spray dries. While we have heard of spray drying, it is not a technique of which we would feel free to take judicial notice. We are of the

opinion that if the Patent Office wishes to rely on what "Those familiar with spray drying would know," it must produce some reference showing what such knowledge consists of. So far as we can see, appellants do spray and their sprayed solution is dried. We are unable to find, however, any indication in the references that such a step would have the effect which appellants sought and found, namely, a reduction of the undesirable oxidation of sulfite to sulfate in an old reaction tending to produce sulfate when the reactant gas contained large amounts of oxygen.

[2] The board apparently thought that the minimizing of sulfate production would be inherent in the process of Friedrich et al. However, this is no support for a rejection for various reasons. Friedrich et al. make no mention of it, as the board conceded. Their process is not appellants' process. It is a reaction between solid, powdered material and gas, the only water present being chemically combined water and hygroscopic water; appellants react sprayed solution and gas. As we pointed out in In re Adams, 53 CCPA 996, 356 F.2d 998, 148 USPQ 742, the inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.

The result of appellants' process is said to be a product low in sulfate content, notwithstanding the use of waste gas containing relatively large amounts of oxygen, an asserted advantage not challenged by the Patent Office. So far as the disclosures of the references are concerned, we have found nothing to suggest it.

Strickler appears to be the only reference which deals with the problem of preventing the formation of sulfate during sulfite production but appears to solve the problem only by avoiding its cause. Sulfur dioxide gas is passed through a solution rather than waste gas containing oxygen and sulfur dioxide. Appellants' brief states, without refutation by the Patent Office, that "It is well known, of course, that this [Strickler] process would only be successful where atmospheric oxygen is excluded and where heavy metal ions are not present." The Patent Office treats this reference as "cumulative" and places little reliance on it.

The solicitor devotes most of his short brief to a discussion of Haywood's process which is different in several respects. The argument attempts to show how the claims can almost be

read on this reference, distinguishing only—but admittedly—in their references to the use of a “solution” and in naming the alkali metal reactants. Haywood is interested in producing calcium sulfite as a paper filler. It is not an alkali metal compound and therefore outside the claims. It is produced from a suspension, not a solution, of lime (CaO) or limestone (calcium carbonate, CaCO₃) brought into contact with a gas containing SO₂. No effort at all is made to dry the product or the gas. In fact, the conditions are such that as fast as the sulfite is formed it falls back into the suspension whence came the raw material. The gas treatment takes place in an “absorber” which is a vessel with liquid in the bottom having an agitator which revolves in the liquid and splashes it upwardly from its surface where it is contacted by the gas. Since the gas is exhausted through a stack the Patent Office would have us treat this as an “upwardly directed stream” within claim 8. We will not do so as this would distort the clear meaning of the claim when read in the light of the specification. Besides, gas flow in the absorbers is horizontal. Next, reliance is placed on Haywood’s temperature disclosures. Here an obvious attempt is made to drag from its context something to meet claim limitations without regard to the true import of the claims. The argument is that if Haywood’s gas is at 400° or 550°C., the gas would necessarily be dry gas and the water would necessarily vaporize immediately, as appellants’ claims contemplate. But Haywood teaches that normally his gas will be about 70°C. This would not necessarily be dry, contrary to what is also contended, being below the boiling point of water. As to the higher temperatures mentioned, all that the patent says is that “There is no objection to introducing the gases into the absorber at a temperature of between 400° and 550°C.” What effect this would have by way of vaporizing water is speculative and would depend on how much gas flows into the absorber how fast, how cold the suspension is, contact time between the mist thrown up by the agitator and the gas at whatever temperature it may have reached, heat loss from the absorber, etc. What goes on in the absorbers is a decidedly wet process having nothing to do with drying. What goes into them is aqueous suspension and that is also what comes out of them.

[3] Finally, the solicitor argues on the basis of Haywood’s optional and later dehydration of his sulfite suspen-

sion to produce a shippable product that the immediate vaporizing and separation steps of the claims are met because it makes no difference that Haywood’s supposedly dried particles fall back into liquid if ultimately they are again dried and separated. We think this is not taking the claims to mean what they say when interpreted as they must be, in the light of the specification. Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502. The solicitor’s use of Haywood amounts to reading things into the reference that are not there and reading things out of the claims that are there. When this has been done, concededly the claims still do not read on Haywood and since this patent does not teach anything about immediate drying after reaction it does not make the invention obvious when added to Friedrich et al. who teach nothing about reacting solution with gas.

Our view is that one faced with the problem of how to use oxygen-containing waste gases in the production of alkali metal sulfites without undue production of sulfate would receive no suggestion from the references to spray a solution of the alkali metal compound into the gas stream under such conditions of temperature and relative humidity as to cause all water present to be immediately vaporized. This is the claimed invention and in our opinion its basic underlying concept is not to be found in the prior art of record.

The rejection of claims 7 and 8 is reversed.

Court of Claims of the United States

MINE SAFETY APPLIANCES COMPANY
et al. v. UNITED STATES

No. 307-60 Decided July 15, 1966

PATENTS

1. Title — Licenses — In general (§ 66.401)

One having license under patent has complete defense to charge of infringement when patent or invention is used in accordance with license.

2. Title — Licenses — Construction (§ 66.407)

Contract provision, in granting to Government a license to practice “each invention, improvement or discovery con-

appraisal of the amount of time involved in its production or to disclose at least a bare bones flow chart of that program to the Patent Office so that the examiner may determine whether one skilled in the art could produce it without unreasonable experimentation and delays.

We held in *Ghiron* that the board had a reasonable basis for questioning the adequacy of the disclosure, and we so hold here. Without some indication of the amount of time and effort which one of ordinary skill might have to expend to develop the program necessary to practice the invention, or a disclosure of the program from which the examiner and the board, perhaps through the shorthand expression of a flow diagram, could determine these, we think the board reasonably determined that the examiner was correct in holding that appellants have not proved that one skilled in the art would have been able to practice their invention without undue experimentation and delays.

The decision of the board is *affirmed*.

Court of Customs and Patent Appeals

In re FELTON

No. 8973

Decided Sept. 20, 1973

PATENTS

1. Patentability — Anticipation — In general (§51.201)

Accidental or unwitting duplication of invention cannot constitute anticipation.

2. Patentability — Invention — In general (§51.501)

It is not obvious to make a structure having all limitations of claims merely because it can also be used as intermediate structure called for by reference, especially since intermediate does not demand critical dimensions set forth in claims.

3. Patentability — Evidence of — Commercial success — In general (§51.4551)

Patentability — Evidence of — Commercial success — Causes (§51.4555)

Court does not agree with position that evidence may be insufficient if commercial success is attributable to unclaimed method of use rather than to structure of claimed device; commercial success of any invention

grows out of fact that it is purchased to be used in some way; nexus between merits of invention and evidence offered must be established before evidence becomes relevant to question of obviousness; important question is whether invention's commercial success is related to advantages flowing from its use which were not available to public before invention was made; if commercial success is unrelated to merits of invention, e.g., if demand is a product solely of advertising, it cannot be persuasive of nonobviousness.

Particular patents—Dropper

Felton, Dropper and Stirrer Dispensing a Single Drop, claims 5 and 8 to 10 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Lloyd Crosser Felton, Serial No. 721,299, filed Apr. 15, 1968; Patent Office Group 311. From decision rejecting claims 5 and 8 to 10, applicant appeals. Reversed.

PIERCE, SCHEFFLER & PARKER (RALPH E. PARKER of counsel) both of Washington, D. C., for appellant.

S. WM. COCHRAN (R. V. LUPO of counsel) for Commissioner of Patents.

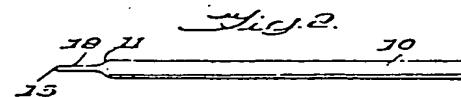
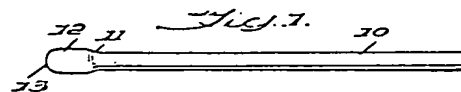
Before MARKEY, Chief Judge, RICH, BALDWIN, and LANE, Associate Judges, and ALMOND, Senior Judge.

ALMOND, Senior Judge.

This is an appeal from the decision of the Patent Office Board of Appeals sustaining the examiner's rejection of claims 5 and 8-10 of appellant's application¹ entitled "Dropper and Stirrer Dispensing A Single Drop." We reverse.

Invention

Appellant's invention is depicted in Figs. 1 and 2 of the drawings:



¹ Serial No. 721,299 filed April 15, 1968.

The invention is described in the specification as follows:

In particular, the one-piece article [10] is formed from a tube of resilient, essentially unplasticized, plastic material having hydrophobic properties and being inert to blood or other liquid to be dispensed thereby. One end of the tube is open and is cleanly cut at right angles to the major axis of the tube. It is this open ended part of the tubular piece which constitutes the dropper of the combined dropper-stirrer article. The opposite end is closed, being sealed shut a short distance (e.g., two-thirds to one-third of an inch) from the terminus of the tubular piece; the sealed flat end portion [12], which may lie in the same plane as that in which lies the major axis of the tube, constitutes a paddle-like stirrer for distributing a drop of liquid which has been provided through use of the remote end of the combined dropper-stirrer article.

As mentioned above, the tube is formed, by extrusion, from a resilient, hydrophobic, essentially unplasticized plastic material. Preferably, the specific plastic material used in forming the aforesaid tube is pure virgin polypropylene, but other plastic materials, such for example as polyethylene, and even polyethylene-coated paper, have been found to be operable. Relatively hydrophilic materials, such for example as cellulose acetate or polyvinyl chloride or polyvinyl acetate, are least desirable. The plastic material should be transparent and may be lightly colored or be colorless. The tube has an internal diameter and a wall thickness which—in conjunction with the resiliency of the material itself—conspire to make the tube readily squeezed shut by pressure between a thumb and a forefinger of a technician and to promptly return to original tubular cross-sectional configuration when pressure on opposite sides thereof is released. In the case of one specific formulation of polypropylene, the tube formed therefrom is 5.0 inches in length and has an internal diameter of 0.152 ± 0.0025 inch and a wall thickness of 0.0065 ± 0.0005 inch, and is adapted to dispense a volume of approximately 0.05 ml. of plasma or serum.

Claim 9 is the broadest claim in the case and reads as follows (subparagraphing ours):

9. A disposable liquid dispensing device for delivering a single drop of liquid of accurate volume, said dropper

consisting of a unitary cylindrical tube having a uniform wall thickness throughout and formed of a resilient material which is inert to and substantially hydrophobic towards the liquid to be dispensed,

which tube is collapsed and sealed shut

for a short distance at one end thereof and is open at its opposite end.

the wall of the tube being at its open end cleanly cut across at right angles to the major axis of the tube,

said open end part of the tube providing a dropper so sized in relation to the viscosity of the liquid to be dispensed that when the empty tube is squeezed shut intermediate its ends by compression between a thumb and a finger and the open end dipped into a body of the liquid to be dispensed and then the pressure released so as to create a sub-atmospheric pressure within the tube sufficient to draw into the tube slightly in excess of a single drop of the liquid to be dispensed, and, when the tube has then been withdrawn from the body of liquid and held vertically over a test area and the tube again is squeezed between thumb and finger one single drop of the liquid can be dispensed from the tube.

Claim 8 which depends from claim 9 requires that the article be made of polypropylene and have the dimensions set forth above in the description of the invention. Claim 5 depends from claim 8 and requires that the article's collapsed end be shaped so that it can function as a spreader for the dispensed drop.

Claim 10 is an independent claim which reads substantially the same as claim 9 but for the additional limitation that the collapsed end be shaped to function as a spreader.

The article which is primarily intended to be an aid in serological testing can be used, according to the specification, as follows:

In use, the dropper is compressed between thumb and forefinger of the technician, about one or two inches from its sealed end, and is squeezed shut while it is lowered (open end down) into a vertically held blood-collecting tube and the open end immersed in a pool of liquid (e.g., blood plasma) in the lower end of the liquid specimen in the blood-collecting tube. Then, release of pressure on the wall of the dropper creates a sub-atmospheric pressure within the dropper sufficient to draw into the dropper slightly in excess of a single drop of the liquid under test. The dropper is then withdrawn from the collecting tube and is held vertically (open end down) over (but spaced from) a designated test area on a test card, and one drop of test liquid is expressed from the dropper onto such test area by suitably squeezing the control portion of the dropper. Thereupon, the technician turns the dropper about in his hand and, with the paddle-like sealed end of the article, he distributes the drop over the test area. Thereafter, the dropper-stirrer article is discarded.

According to appellant's specification, serological testing requiring an accurately dispensed drop was formerly carried out by the following process generally known to the prior art:

For delivering a single drop of plasma or serum to the test area of a test card * * *, it heretofore had been conventional to use a glass capillary tube equipped with a rubber bulb for sucking liquid into the capillary. By skilled use of this device it was possible to draw up a small amount of plasma or serum from a blood collecting tube and to deliver a single drop of the liquid to a test spot, whereupon the liquid drop could be distributed over the area of the test spot by stirring it about with a conventional flat-ended toothpick. The rubber bulb could then be drawn off of the used capillary tube and used toothpick could be discarded.

The Rejection

The board affirmed the rejection of the claims under 35 U.S.C. 103 as obvious over Sands et al. (Sands)² in view of Wolman³ and Gross.⁴

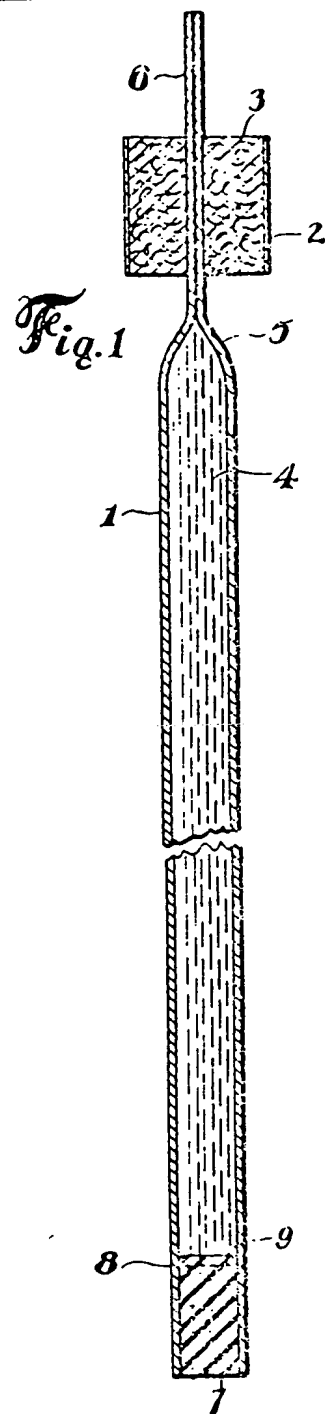
Sands discloses a dispensing device for introducing medicaments into body cavities. The following figure from the patent is illustrative of that device.

In the figure, 1 is an elongated cylindrical tube which, according to the specification, can be made from " * * * any well known material such as paper of various types, rubber, 'Cellophane,' thin molded plastics, metal foil and the like." The specification also indicates that it is desirable that the material be moisture proof and be capable of yielding a fuzzy edge when torn.

The tube is closed by flattening at one end forming end portion 6, filled with a medicament 4 and then provided with a seal 7 of wax or other suitable material. A slide 3 is placed on the flattened end. In use, the sealed end of the tube is torn off, along score line 8 if provided. The opened tube is inserted into the body cavity and the slide advanced to extrude the contents into the body.

Wolman discloses a bulb of compressible material having the capability of dispensing a predetermined volume of liquid. In its simplest form, the bulb is provided with means which limit the extent to which it can be compressed. Since the bulb is filled with enough fluid for several measured discharges, it is this limitation which determines the volume to be dispensed by the bulb.

Gross describes a fluid dispenser made up of a flexible bottle for a reservoir, a closure plug



² U. S. 2,129,627 issued September 6, 1938.

³ U. S. 2,579,718 issued December 25, 1951.

⁴ U. S. 2,770,399 issued November 13, 1956.

for the bottle and a tube extending through the plug into the bottle. The fluid is dispensed by squeezing the bottle which forces the fluid out through the tube. There is no provision which would adapt the dispenser to discharge a predetermined amount with accuracy.

Although the board affirmed a rejection under section 103, its opinion also indicates that the invention was considered as anticipated by the structure in Sands within the meaning of 35 U.S.C. 102. The opinion states:

The structure of Sands et al. before the scoring at 8 and before the introduction of closure material 7 is the same as that recited in the claims on appeal.

In claims 9 and 10 appellant attempts to define the size of his tube in terms of function and with respect to the viscosity of the dispensed liquid. The liquid is properly not set forth as a positive element of the claims. The viscosities of various liquids may differ greatly from each other. Recitation of the size of the open end part of the tube in relation to the viscosity of the not positively claimed liquid is at best a limitation of questionable definiteness. Cf. *In re Law*, 49 CCPA 1157, 303 F.2d 951, 782 O.G. 286, 1962 C.D. 395, 133 USPQ 653. Characteristics which are identifiable only in the use of the structure constitute no definite distinction of the structure per se over the reference. Claims 9 and 10 clearly are readable on tubes of various diameters within the scope of the disclosure of Sands et al. [Emphasis added.]

We do not agree that the limitation in the claims expressed as a relationship between the size of the opening and the viscosity of the liquid to be dispensed is of "questionable definiteness." Assuming, as apparently did the board, that there is a relationship between the viscosity of any specific liquid to be dispensed and the size of the opening required if a single drop is to be dispensed, appellant's claims in our view are not indefinite in the sense that the scope of protection sought cannot be ascertained. In any event, the issue is not the definiteness of the limitation but whether the limitation is sufficient to distinguish the claimed structure from the reference. It was about the latter question that the outcome in *Law* actually revolved.

[1] In our view, the limitation in claims 9 and 10 does distinguish them from the Sands' structure. In this regard we do not disagree with the board's apparent conclusion that an intermediate structure made for the Sands' device could possess the characteristics called for in these claims. However, in view of the purpose for which the Sands' device is intended, it is apparent that it requires no critical dimension which would lead to a structure inher-

ently having those characteristics. Therefore, it would be mere happenstance if any structure made according to Sands met the limitations of the claims. An accidental or unwitting duplication of an invention cannot constitute an anticipation. *Tilghman v. Proctor*, 102 U.S. 707 (1880); *Eibel Process Co. v. Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923). For this reason, we do not believe that Sands has "identically disclosed or described" the invention as required of an anticipatory reference applied under section 102. The disclosure as a whole cannot be considered to sufficiently direct one skilled in the art to the invention which is a single drop dispenser requiring critical dimensions.

The board's opinion is not devoid of reasoning that would support a rejection under section 103. It states:

In our opinion, to one ordinarily skilled in the art the Sands et al. disclosure and well known plastic materials would suggest the structure, size, and material of appellant's claimed tube for use in the Sands et al. method of making their final product, namely a dispensing device. Where, as here, the substance of the claimed device is obvious for some significant purpose, it is immaterial as to patentability under 35 U.S.C. 103 that appellant has disclosed another obvious or unobvious purpose. *In re Mod*, 56 CCPA 1041, 408 F.2d 1055, 161 USPQ 281 [other citations omitted].

[2] We do not agree that it would be obvious to make a structure having all the limitations of the claims on appeal merely because it can also be used as the intermediate structure called for by Sands. Certainly, that intermediate does not demand the critical dimensions set forth in the claims. We have also concluded that the claims are not obvious over Sands in view of *Wolman and Gross*. The board did not feel that it was necessary to rely upon the latter two references to sustain the rejection. We agree that they add little to Sands as none of the art of record is directed to single-drop dispensers and does not suggest the criterion that would be demanded of a tubular structure having that capability.

Appellant made of record below several affidavits alleging commercial success flowing from his invention. We think this evidence is of such a character that it convincingly supports the patentability of the claims over the prior art of record. However, the board treated this evidence in the following manner:

We have considered all the affidavits filed under Rule 132 relating to commercial success. As to rejections under 35 U.S.C. 103, such affidavits are significant only when close questions of obviousness exist. That is not the case here. Furthermore, there is no

evidence that the success indicated by affidavits is attributable to the structure per se of the appealed claims rather than to appellant's not claimed method of using the structure.

Despite the board's comment on the significance of evidence of commercial success and its view of the "closeness" of the obviousness question in this case, it would appear that it did consider the affidavits on their merits but found no connection between the alleged success and the claimed invention. Recently we have set forth our view of the manner of evaluating evidence of commercial success relative to the question of whether an invention would have been obvious within the meaning of section 103. See *In re Fielder*, 471 F.2d 640, 176 USPQ 300 (CCPA 1973), and cases cited therein. It is not necessary for us to repeat that discussion here.

[3] Directing our attention now to the merits of the evidence of record here, we do not agree with the position implicitly held by the board to the effect that the evidence may be insufficient if the commercial success in question is attributable to the unclaimed method of use rather than the structure of the device itself. We think it would be fair to say that the commercial success of any invention grows out of the fact that it is purchased to be used in some way.

A nexus between the merits of the invention and the evidence offered must be established before that evidence becomes relevant to the question of obviousness. *In re Caveney*, 55 CCPA 721, 386 F.2d 917, 155 USPQ 681 (1967). The important question is whether the invention's commercial success is related to advantages flowing from its use which were not available to the purchasing public before the invention was made. If the commercial success is unrelated to the merits of the invention, e.g., if demand is a product solely of advertising, then it cannot be persuasive of nonobviousness.

The evidence of commercial success offered in this case is for the most part embodied in three affidavits. These affidavits were executed by officials of the health departments of Maryland, Pennsylvania, and Utah. The thrust of their averments is that their organizations have adopted the claimed device, marketed under the trademark "Dispenstir" as a part of a serological testing kit, in preference to the rubber bulb-capillary tube technique. The affidavits allege that the new device is more rapid (about twice as fast) and more accurate than the procedure they had been using. This meant that labor costs were significantly reduced.

Two other affidavits were executed by an employee of the distributor of Dispenstirs.

These affidavits indicate that the health departments of New York City and the State of Colorado, the Provincial Laboratory in Edmonton, Alberta and two Army hospitals have also switched to Dispenstirs. The affidavits also indicate that there is significant demand for Dispenstirs sold separately from the kits. In them it is also alleged that more than 11,000,000 Dispenstirs were sold between September 1, 1969 and October 19, 1970, most as part of a serological kit, and that sales for that period exceeded \$490,000. We are convinced that appellant has demonstrated that the success achieved by his invention has grown out of the advantages flowing from its use as recognized by those skilled in the art and is, therefore, relevant to the question of obviousness.

We conclude that the invention would not have been obvious in view of the art of record which, as we have already indicated, is not directed to single-drop dispensers, especially in view of the evidence of commercial success. Accordingly, the board's decision is reversed.

Court of Customs and Patent Appeals

In re HARRIS

No. 9037

Decided Sept. 20, 1973

PATENTS

Particular patents—Aiming Device

Harris, Aiming Device, claims 5 and 6 of application refused.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Samuel G. Harris, Serial No. 821,177, filed May 2, 1969; Patent Office Group 250. From decision rejecting claims 5 and 6, applicant appeals. Affirmed.

KEMON, PALMER & ESTABROOK (SOLON B. KEMON of counsel) both of Washington, D. C., for appellant.

S. WM. COCHRAN (RAYMOND E. MARTIN of counsel) for Commissioner of Patents.

Before MARKEY, Chief Judge, RICH, BALDWIN, and LANE, Associate Judges, and ALMOND, Senior Judge.

BALDWIN, Judge.

This appeal is from the decision of the Patent Office Board of Appeals, adhered to on reconsideration, sustaining the rejection of